

S7000 Series TV Analyzer

Operation Manual

Version 1.3



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DEVISER

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1. The Basics

- General Information
- Getting started
- Getting to know S7000

1.1 General Information

1.1.1 Helpful Website

<http://www.devisertek.com>

1.1.2 Warranty and Service

Warranty

The instrument is warranted for 12 months under normal operating conditions (except battery). Users should read manual carefully before first use and operate correctly according to the manual.

Deviser shall have no responsibility for any defect or damage caused by improper use and maintenance or for any product which has been repaired or altered by any one others not DEVISER or our authorized service center.

Technique Support

Please contact Deviser or our local distributors in your territory for technique support, repair service or calibration service. Deviser contact information:

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Fax: +86 22 2764 5002

Email: overseasbiz@deviser.com.cn

<http://www.devisertek.com>

For quicker support response when calling or sending e-mail, please provide the following information:

- Your name and your company name.
- The technical point of contact (name, phone number, e-mail).
- The meter serial number, firmware and hardware version numbers.
- A detailed description of the problem you are having, including any error or information messages.

1.1.3 How the manual is organized

This manual is divided into the following sections:

- **Section 1: The Basics-** provides Deviser contact information, warranty and S7000 appearance introduction.
- **Section 2: Setup-** provides S7000 system information, measurement setup and channel setup.
- **Section 3: Cable&Terrestrial Signal Test-** provides introduction of testing function in cable and terrestrial system.
- **Section 4: Satellite Signal Test-** provides introduction of testing function in satellite system.
- **Section 5: TS Monitor & Analysis-** provides introduction of TS analyzer module which supports both DVB

and ATSC standard.

- **Section 6: IPTV-** introduces IPTV.
- **Section 7: File Management-** provides file management, including: picture and data view, delete, transfer, rename and so on.
- **Section 8: Appendix-** provides specification and annotation.

1.1.4 ESC(Electrostatic Discharge)

Electrostatic discharge can damage or destroy electronic components, therefore, all work on electronic assemblies should be performed at an antistatic workstation. The following suggestions may help to reduce ESD damage that may occur during testing and servicing operations.

- Before connecting any coaxial cable to the instrument, momentarily ground the center and outer conductors of the cable.
- Personnel should be grounded with a resistor-isolated wrist strap before touching the center pin of any connector and before removing any assembly from the instrument.
- Be sure that all instruments are properly earth-grounded to prevent a buildup of static charge.

1.2 Getting Started

1.2.1 Overview

S7000 is a versatile TV analyzer which supports DVB-C/S/S2/T/T2 standard digital TV analysis, MPEG1/2/4, H.264 Video Record, TS analysis and spectrum analysis.

1.2.2 Shipping Inspection

After removing the instrument from its packaging, perform the following steps:

- 1) Take the instrument out of the case to ensure that no damage occurred during shipment. Unload the case carefully and check the package. If the package is in good condition, save it for later use. A damaged package indicates that the instrument has endured significant impact during transportation. If the package is in such a condition, keep it in its original state and contact the freight company to perform an inspection (in your presence) of the instrument. You can claim damages to the freight company according to the degree of damage to the instrument, contact us to arrange any repairs.
- 2) Check that all of the supplied equipment listed in the table on the following page is present. If any of the equipment is not present, contact us.

1.2.3 Accessories

Item	Description
Battery Charger	12V/5A
Charger line	1
Vehicle Charger line	1
F connector	75Ω
Instrument bag	1
User manual	CD

Table 1-1

1.3 Getting to know S7000

1.3.1 Front Panel

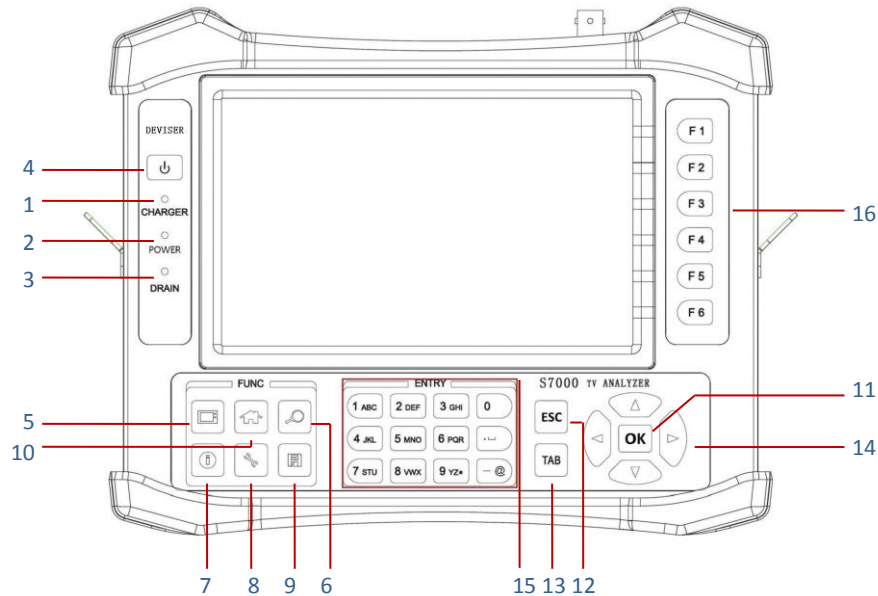


Figure 1-1

TFT LCD: 7", Resolution: 800×480.

1.3.1.1 Indicator

- 1) External DC charger operation indicator.
- 2) Power ON/OFF indicator.
- 3) External instruments power supply indicator.

1.3.1.2 Keyboard

- 4) **Power ON/OFF** key, press this key and hold to turn the device on and off.
- 5) **TV** key, this key is used to enter into TS Monitor & Analysis function.
- 6) **AUTO ID/EXPLORER** key, this key is used to channel parameter automatic setup.
- 7) **CH INFO** key, this key is used to enter into current channel information edit menu.
- 8) **SETUP** key, this key is used to enter into system setup from home menu and related setup menu in different function display.
- 9) **SAVE** key, this key is used to save picture and data file.
- 10) **HOME** key, this key is used to return to the main menu.
- 11) **ENTER** key, this key is used to accept changes and confirm numerical value entries.
- 12) **ESC** key, this key is used to escape from the current function/view or return to function/view.

- 13) **TAB** key, this key is used to switch marker.
- 14) **UP** key, **DOWN** key, **LEFT** key, **RIGHT** key, the keys are used to move cursors and change the value within a function display.
- 15) **Keypad**, these keys are used to enter alphanumeric characters.
- 16) **Function soft keys**, these keys are used to access various functions within the display.

1.3.1.3 Title Bar

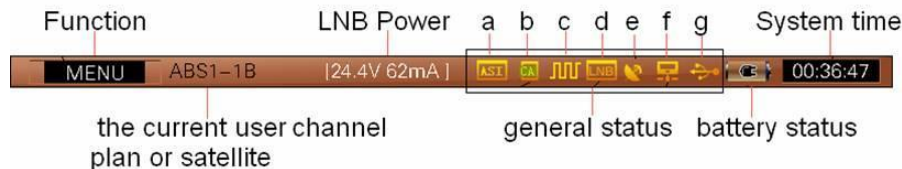


Figure 1-2

- a. TS-ASI indicator. It indicates that ASI function works when this icon appears on the title bar. Please see **Section 2: SETUP->INTF->TS INTERFACE** to get the operation,
- b. CA indicator. It indicates that the instrument recognizes CA card successfully when this icon appears on the title bar. And then users can run the **TS Monitor & Analysis** function. Please see **Section 5: TS Monitor & Analysis** to get the operation.
- c. 22KHz signal indicator. Users must run this signal when using DiSEqC. It indicates that the running is successful when this icon appears on the title bar. Please see **Section 2: SETUP->INTF->LNB POWER** to get the operation.
- d. LNB power supply indicator. It indicates that the instrument runs LNB power when this icon appears on the title bar. Please see **Section 2: SETUP->INTF->LNB POWER** to get the operation.
- e. GPS indicator. It indicates that the instrument recognize GPS module successfully when this icon appears on the title bar.
- f. LAN connector indicator. It indicates that the instrument connects the LAN line successfully when this icon appears on the title bar.
- g. USB connector indicator. It indicates that the instrument recognizes USB successfully when this icon appears on the title bar.

1.3.2 Left Panel

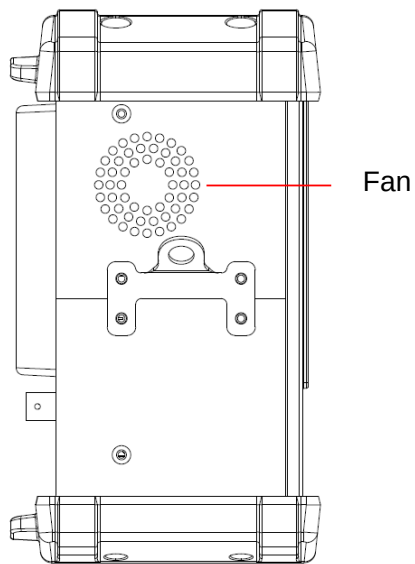


Figure 1-3

1.3.3 Right Panel

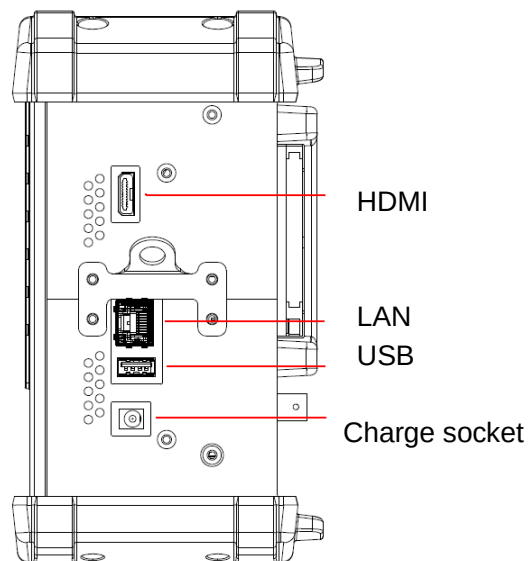


Figure 1-4

1.3.4 Rear Panel

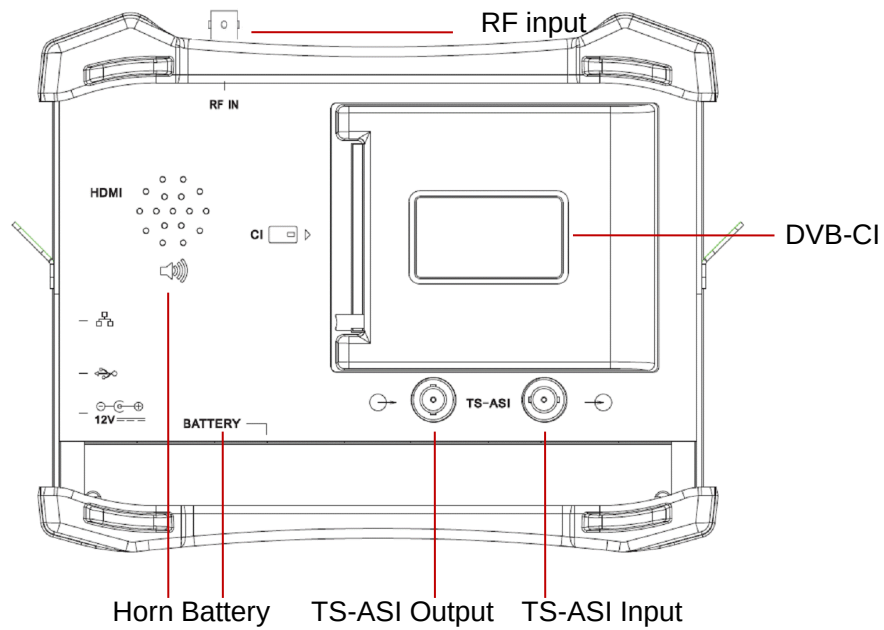


Figure 1-5

NOTE: RF input: DC~100Hz, 30VDC, 5MHz~2150MHz, +21dBm.

1.3.5 Power Supply

S7000 is powered by both built-in battery and external power adapter. Please charge S7000 before using.

1.3.5.1 Battery

S7000 TW use built-in 7.4V/13AH Li-Polymer battery and work over 5 hours when fully charged. Once the voltage of the battery is lower than 7.15V, S7000 TW pops up a message box: LOW BATTERY! Once the voltage of the battery is lower than 6.8V, S7000 TW pops up a message box: LOW BATTERY! and the battery icon flashes. Once the voltage of the battery is lower than 6.5V, S7000 TW pops up a message box: LOW BATTERY! and the buzzer bells. The instrument will shut down automatically after the buzzer stops belling.

NOTE:1 The instrument can be only charged by the charger provided together with S7000.

2 It is suggested to power off the instrument when charging.

3 Low temperature may reduce the capability of the battery, but the battery will not be damaged; And high temperature will cause the unrecoverable damage.

4 Please replace the battery when its working hours shorten distinctly.

1.3.5.2 Charge

Please charge the instrument as following charge process:

- 1) Insert the charge output plug to S7000 charge socket.
- 2) Connect the charger to AC 100V-240V Power and the charge light will light with red.
- 3) When the charge light becomes to green, the instrument has been charged the whole capacity. We suggest you charge one more hours to extend battery life. After charging, you can disconnect the charge input plug with power and pull out the charge output plug.

NOTE: The battery must use the relevant charger to charge. The instrument can not be charged in the temperature beyond 10℃~35℃, otherwise the battery life will be shorten.

2. Setup

- System Setup
- Channel Information Setup

2.1 Setup

2.1.1 Overview

The instrument enables you to select from numerous instrument setup and utility functions. This chapter will provide you with instructions on how to utilize the functions available in the Setup Menus of the instrument. Perform the following steps to enter the Setup Window:

- 1) Select  key (**HOME**) to return to the main Menu.
- 2) Select  key (**SETUP**) then the Setup Window will appear with the **ABOUT** Tab displayed.
- 3) To navigate within the Setup Window, select the     keys to select the corresponding **SETUP** Tab shown at the right side of the Main Display Area.

2.1.2 System Information

Select the **ABOUT** Tab to display the system information (default selection when entering the Setup Window). The following information is included in the **ABOUT** Tab, as refer to the Figure 2-1.



Figure 2-1

Press  keys (**UP/DOWN**) to the second page as Figure 2-2.

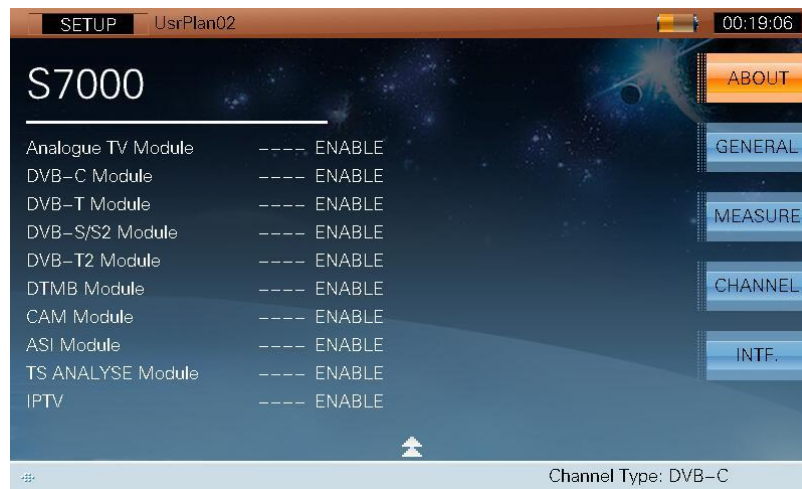


Figure 2-2

2.1.3 General Settings

Select the **GENERAL** Tab to display and adjust the general system settings. The following settings are included in the **GENERAL** Tab, as shown in Figure 2-3.

- Network Settings
- PING
- Display and Battery Settings
- Date and Time Settings
- Skin Settings
- Language Settings
- Operator Name
- Factory Reset

2.1.3.1 Network Settings

Users may access network with RJ45 connection.

- Automatic Network Parameters, refer to Figure 2-3.

To enable automatic network parameters sent from a DHCP server, perform the following steps:

- 1) Select  keys (**UP/DOWN/LEFT/RIGHT**) to highlight the DHCP check box.
- 2) Select  key (**ENTER**) to select the check box.
- 3) Once the **DHCP** check box is selected, the IP Address, Net Mask, Gateway, and DNS will all be assigned by the DHCP server and can not be manually adjusted.



Figure 2-3

- Manual Network Settings, refer to Figure 2-4.

To enable manual network parameters, perform the following steps:

- 1) While the DHCP check box is not selected, select  key (**TAB**) or  keys (**UP/DOWN/LEFT/RIGHT**) to highlight the first segment of the **IP ADDR** field. Refer to Figure 2-4.
- 2) Use the Alphanumeric Keypad to enter the address value.

Select  key (**TAB**) or  keys (**UP/DOWN/LEFT/RIGHT**) to highlight the remaining address segments and repeat until all addresses are populated.



Figure 2-4

2.1.3.2 PING

PING is used to check the network smooth and the connection speed. The current IP address of S7000 is regarded as the source IP (If you want to amend IP address, you should select **NETWORK**). Please connect S7000 and the destined instrument by LAN line, input the destined IP address in the column (Please make the two IP address on the same network segment), then press **START** to start testing. During testing, **START** will be **STOP**. The test information will be shown on the screen in real-time. Refer to Figure 2-5.

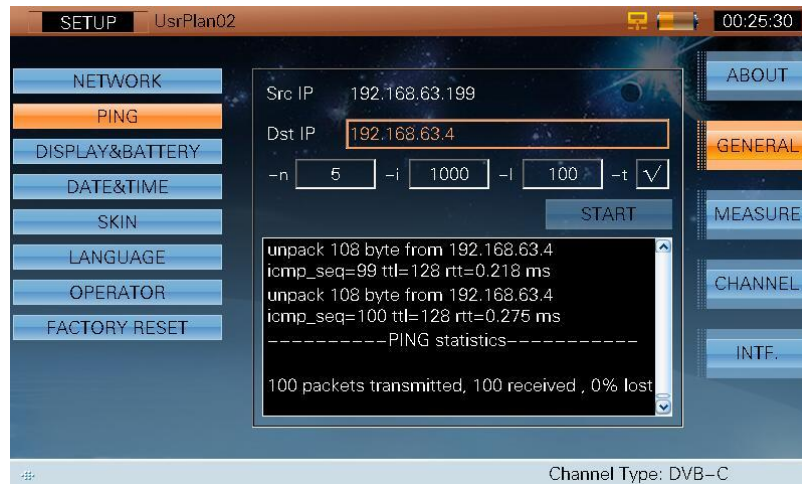


Figure 2-5

Setup instruction:

-n, Data package quantity of ping command.

-i, The time interval of data package sending, the unit is MS.

-l, Data package length of Ping.

-t, When **-t** option is selected, it will run ping command continuously, send no more than 100 packets. Otherwise, it will send n packets.

2.1.3.3 Display and Battery Settings

From the **GENERAL** Tab, select  keys (**UP/DOWN**) to enter the **DISPLAY&BATTERY** setup screen.

The following information is included in the **DISPLAY&BATTERY** Tab, as shown in the Figure 2-6.

- **Backlight Settings**

Select  keys (**LEFT/RIGHT**) and  key (**ENTER**) to adjust the backlight.



Figure 2-6

- **Power Off Settings**

To save battery power, S7000 can be set to shut-off automatically when it is inactive for 3 minutes, 5 minutes, 10 minutes or 30 minutes as shown in the Figure 2-7. If the **NEVER** option is selected, the instrument will not shut-off automatically.



Figure 2-7

2.1.3.4 Date and Time Settings

The Date and Time Settings allows the user to set the system date and time as shown in the Figure 2-8.



Figure 2-8

Select  keys (UP/DOWN/LEFT/RIGHT) and  key (ENTER) to adjust the local date and time.

2.1.3.5 Skin Settings

The Skin Settings allows the user to change the system skin as shown in the Figure 2-9.



Figure 2-9

2.1.3.6 Language Settings

The Language Settings allows the user to set the system language as shown in the Figure 2-10. After the language is selected, S7000 will transform menus to the selected language automatically.



Figure 2-10

NOTE: Contact us for more local languages.

2.1.3.7 Operator Name

The operator name and company can be entered into S7000 as shown in the Figure 2-11.

Select  keys (UP/DOWN/LEFT/RIGHT),  key (ENTER) and Alphanumeric Keypad to enter the names. After saving, the desired name will be displayed.



Figure 2-11

NOTE: The operation system could save 20 operators' information.

2.1.3.8 Factory Reset

The Factory Reset allows the user to restore the factory default setup.

2.1.4 Measurement Settings

Select the **MEASURE** Tab to display and adjust the measurement settings. The following settings are included in the **MEASURE** Tab.

- HUM Settings
- Level Unit Settings
- TP COMPENSATION
- Display Format
- Digital TV mode
- ANALOG TV mode

2.1.4.1 HUM Settings

S7000 supports HUM measurement to ANALOG channel. HUM modulation is also named as power HUM modulation distortion, which caused by low-frequency interference of the power. Select  keys (**UP/DOWN/LEFT/RIGHT**) and  key (**ENTER**) to select either 50Hz or 60Hz as shown in the Figure 2-12.



Figure 2-12

2.1.4.2 Level Shift Settings

S7000 allows the user to make adjustments to compensate for various measured data in the Level and Channel Scan functions by adjusting the Level Shift value as shown in the Figure 2-13.

Select  keys (**UP/DOWN/LEFT/RIGHT**),  key (**ENTER**) and the Alphanumeric Keypad to enter a Level Shift value from -3dB to +3dB.



Figure 2-13

Also, S7000 allows the user to select the desired measure level unit dB μ V, dBmV, or dBm as the Figure 2-14.



Figure 2-14

2.1.4.3 TP COMPENSATION

S7000 allows the user to make adjustments to compensate for test probe by adjusting the compensation value as shown in the Figure 2-15.

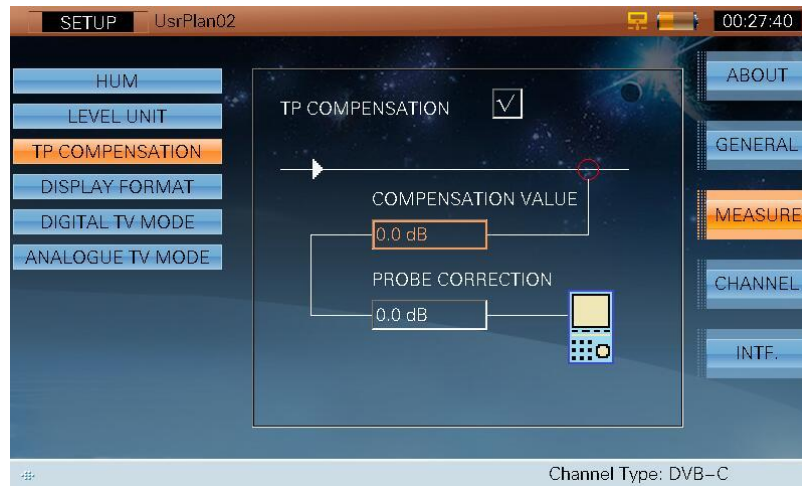


Figure 2-15

Select  keys (**UP/DOWN/LEFT/RIGHT**),  key (**ENTER**) and the Alphanumeric Keypad to enter a compensation value from 0dB to +40dB.

When **TP COMPENSATION** is not selected, users can not edit the compensation. Refer to Figure 2-16.

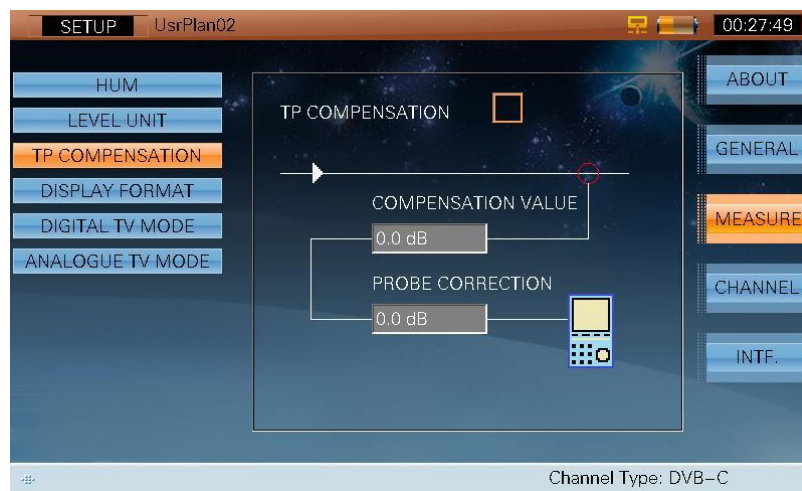


Figure 2-16

2.1.4.4 Display Format

S7000 supports two different displayed formats: Decimalism and Hexadecimal, as shown in the Figure 2-17. This function will be used in TS Measurement.



Figure 2-17

2.1.4.5 Digital TV Mode

S7000 supports two different digital TV modes: ATSC and DVB, as shown in the Figure 2-18. This function will be used in TS Measurement.



Figure 2-18

2.1.4.6 ANALOG TV Mode

The interface of ANALOG TV Mode is shown as Figure 2-19.



Figure 2-19

2.1.5 Channel Settings

Select the **CHANNEL** Tab to display and adjust the channel settings. The following settings are included in the **CHANNEL** Tab.

- Selecting an Active User Channel Plan
- Learning a User Channel Plan
- Editing a User Channel Plan
- Editing a Tilt Measurement Channel Plan
- Satellite List
- Adding Satellite

2.1.5.1 Select User Channel Plan

Up to sixteen user channel plans can be built and saved. The user channel plans are labeled as [UsrPlan00] through [UsrPlan15] and the user can select only one user channel plan as the active plan. S7000 will measure according to the parameters and settings entered in the selected user channel plan.

To select the active user channel plan, perform the following steps:

Select  keys (**UP/DOWN/LEFT/RIGHT**) and  key (**ENTER**) to select the desired user channel plan. After selecting the plan, use the Alphanumeric Keypad to enter the user channel plan name (if desired), as shown in the Figure 2-20.



Figure 2-20

2.1.5.2 Learn User Channel Plan

Before attempting to use S7000, the user must create a User Channel Plan. Once completed, this will allow S7000 to measure all the channels automatically and save the various measurement data.

Perform the following steps to learn a User Channel Plan:

Connect S7000 to the cable system.

- 1) Select  keys (**UP/DOWN**) to select the **LEARN USER PLAN**, as shown in Figure 2-21.
- 2) Select  keys (**UP/DOWN**) to select the type of user channel plan from CCIR, NCTA, OIRT and CHINA.
- 3) Select  key (**TAB**) or  keys (**UP/DOWN/LEFT/RIGHT**) to highlight ANALOG and/or DIGITAL, then select  key (**ENTER**) to select one or both types of channels to include in the user channel plan. Refer to Figures 22 and 23.
- 4) If the Digital Channel Type is selected, proceed to Step 5). Otherwise, proceed to Step 6).
- 5) When the Digital Channel type is selected in Step 4), the Bandwidth (BW), and Standard can also be edited.

Bandwidth:

Select  keys (**UP/DOWN/LEFT/RIGHT**) to highlight **BW**, then use the Alphanumeric Keypad to enter the Bandwidth value. Select  key (**ENTER**) to accept the new Bandwidth value.

Standard:

Select  keys (**UP/DOWN/LEFT/RIGHT**) and  key (**ENTER**) to select **STANDARD**, then select  key (**ENTER**) to accept the highlighted **STANDARD**.

Modulation Type:

Select  keys (**UP/DOWN/LEFT/RIGHT**) and  key (**ENTER**) to select **TYPE**, then select  key (**ENTER**) to accept the highlighted modulation type.

Symbol Rate:

Select  keys (**UP/DOWN/LEFT/RIGHT**) and  key (**ENTER**) to select **SR**, then use the Alphanumeric keypad to enter the Symbol Rate value. Select  key (**ENTER**) to accept the new Symbol Rate value.

- 6) Select  keys (**UP/DOWN/LEFT/RIGHT**) to highlight the **START** Button.
- 7) Select  key (**ENTER**) to start learning the user channel plan.
- 8) When the learning process is completed, S7000 will automatically save the settings to the active user channel plan.



Figure 2-21



Figure 2-22



Figure 2-23

2.1.5.3 Edit User Channel Plan

You can set the channel number plan type to be displayed in Digital (numeric) Mode (also known as EIA Mode) or Standard (alphanumeric) Mode as the Figures 2-24 and 2-25. Select  keys (**UP/DOWN**) and  key (**ENTER**) to edit each individual channel. Select **SELECT**, S7000 will display the interface of Channel information and the user can enable the channel (See **Section 2.2**). Select **ENABLE ALL**, all the channels are enabled. Select **DISABLE ALL**, all the channels are disabled.



Figure 2-24



Figure 2-25

2.1.5.4 Edit Tilt Plan

Up to sixteen channels can be tested in Tilt Measurement Mode. Select  keys (**UP/DOWN**) and  key (**ENTER**) to enable the channels you wish to add to the Tilt Measurement. (To disable a marked channel, select  key (**ENTER**) again.)

The 'V' indicator is shown to mark the enabled channels. They will be displayed in sequence according to their frequency value in the table, as shown in the Figure 2-26.



Figure 2-26

Press  key (**ESC**) to exit, one dialog box will appear: Are you sure to save the changes? Select 'YES' to save and 'NO' to exit without saving.

2.1.5.5 Satellite List

Before attempting to use the SATELLITE function in S7000, user must edit the desired satellite list. Once completed, this will allow S7000 to measure all the satellites automatically and save the various measurement data.

Select  keys (**UP/DOWN**) and  key (**ENTER**) to enable the satellites you wish to add to the Satellite List. (To disable a marked satellite, select  key (**ENTER**) again.) Select **ENABLE ALL** to enable all the satellites and select **DISABLE ALL** to disable all the satellites (except current satellite).

The 'v' indicator is shown to mark the enabled satellites. They will be displayed in the table, as shown in the Figure 2-27.



Figure 2-27

Press  key (**ESC**) to exist, one dialog box will appear: Are you sure to save the changes? Select 'YES' to save and 'NO' to exit without saving.

NOTE: In Dish Align and CH INFO Setup function, you can switch the satellites in enable satellite list quickly.

2.1.5.6 Adding Satellite

S7000 allows the user to add the desired satellite to the list, as shown in the Figure 2-28.

Select  keys (**UP/DOWN/LEFT/RIGHT**),  key (**ENTER**) and Alphanumeric Keypad to enter the satellite name, longitude, and the amount of transponder. After adding, the satellite will automatically be added to the list.



Figure 2-28

2.1.6 INTERFACE

Select the **INTF.** Tab to display and adjust the external ports settings. The following settings are included in the **INTF.** Tab.

- LNB Power
- TS Interface
- GPS

2.1.6.1 LNB Power

Select  keys (**UP/DOWN**) and  key (**ENTER**) to select the LNB Power. The LNB power supply screen for Cable & Terrestrial band is shown as the Figure 2-29. The LNB power is used for antenna.



Figure 2-29

The LNB power supply screen for satellite band is shown as the Figure 2-30.



Figure 2-30

The instructions of LNB power is following.

LNB power	Instruction
AUTO	The instrument will run the LNB power automatically according to the current satellite setup.
13V	Polarization is vertical, low LNB OSC
18V	Polarization is horizontal, low LNB OSC
13V+22K	Polarization is vertical, low LNB OSC
18V+22K	Polarization is horizontal, low LNB OSC
24V	Support 24V

Table 2-1

2.1.6.2 TS Interface

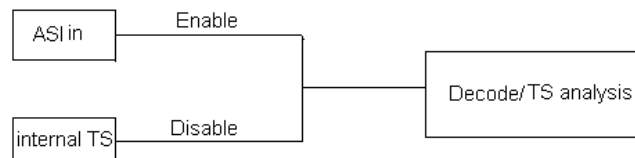
The TS-ASI Input/Output signals works through the connectors located at the rear panel. Refer to Figure 2-31.



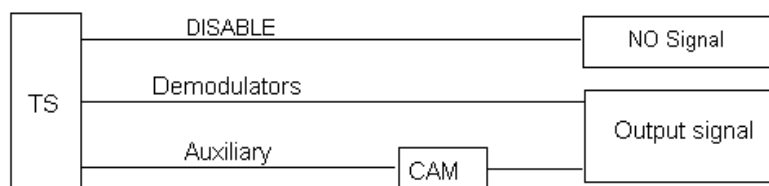
Figure 2-31

The instructions of **ASI IN** and **ASI OUT** are following:

ASI IN:



ASI OUT:



2.1.6.3 GPS

When the external GPS is not connected, S7000 allows the user to configure GPS manually to calculate installation angle of the dish, when the external GPS is not connected with S7000, as shown in the Figure 2-32.

When the external GPS is connected,  or  icons will appear on the main title and S7000 will position automatically.

 : Searching for the positioning.

 : Positioning successfully, the detailed GPS information will appear as the Figure 2-33.



Figure 2-32



Figure 2-33

2.2 Channel Information Setup

2.2.1 Brief Introduction

S7000 allows the user to view and/or adjust the measurement configuration according to the channel types, ANALOG TV, DVB-C, DVB-T, DVB-T2, DTMB, ANALOG FM and DVB-S/S2.

Select  key (**CH INFO**) to view the channel/satellite information at any measurement screen in cable & terrestrial system or satellite system.

2.2.2 Cable & Terrestrial System

2.2.2.1 ANALOG TV

In the channel type of ANALOG TV, the following settings are included as shown in the Figure 2-34. Select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **STD NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **VID FREQ**, Video frequency.
- **AUD FREQ**, Audio frequency.



Figure 2-34

2.2.2.2 DVB-C

In the channel type of DVB-C, the following settings are included as shown in the Figure 2-35. Also select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **SID NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **FREQ**, Frequency.
- **MEASURE BW**, Bandwidth.
- **MODULATION**, Modulation Type.
- **STANDARD**, Standard.
- **SR**, Symbol Rate.



EIA NUMBER	107	MODULATION	256QAM
STD NAME	S7	STANDARD	J.83A
STATUS	ENABLE	SR	6.952 MS/s
SIGNAL TYPE	DVB-C		
FREQ	162.00 MHz		
MEASURE BW	8.00 MHz		

RESET

SAVE

Figure 2-35

2.2.2.3 DVB-T

In the channel type of DVB-T, the following settings are included as shown in the Figure 2-36. Also select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **SID NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **FREQ**, Frequency.
- **MEASURE BW**, Bandwidth.
- **MODULATION**, Modulation Type.
- **GUARD**, Guard Interval.
- **FFT MODE**, Carriers mode.
- **CODE RATE**.
- **HIERARCHY**.
- **CELL ID**.



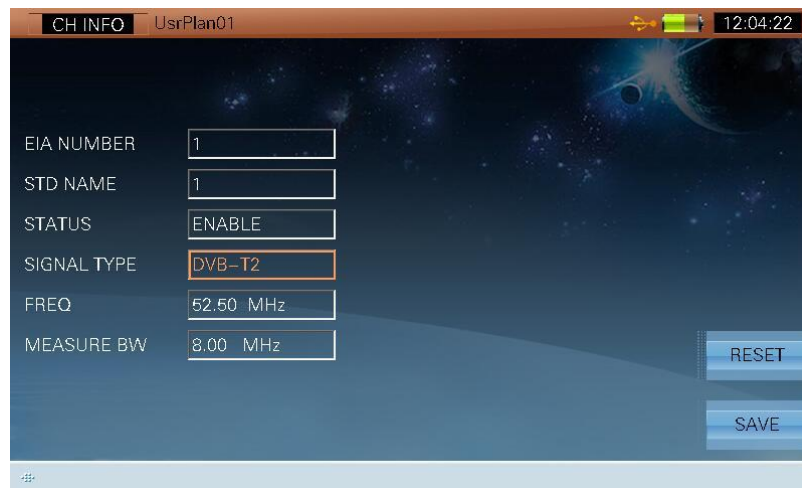
CH INFO	123	ASX	00:32:19
EIA NUMBER	107	MODULATION	QPSK
STD NAME	S7	GI	1/32
STATUS	ENABLE	FFT MODE	2K
SIGNAL TYPE	DVB-T/H	CODE RATE	1/2
FREQ	162.00 MHz	HIERARCHY	None
MEASURE BW	8.00 MHz	CELL ID	0
			RESET
			SAVE

Figure 2-36

2.2.2.4 DVB-T2

In the channel type of DVB-T2, the following settings are included as shown in the Figure 2-37. Also select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **SID NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **FREQ**, Frequency.
- **MEASURE BW**, Bandwidth.



The screenshot shows a user interface for channel configuration. At the top, there is a header bar with 'CH INFO' and 'UsrPlan01'. Below this, a list of settings is displayed, each with a label and a corresponding input field or button. The settings are: EIA NUMBER (1), STD NAME (1), STATUS (ENABLE), SIGNAL TYPE (DVB-T2), FREQ (52.50 MHz), and MEASURE BW (8.00 MHz). The 'DVB-T2' option is highlighted with an orange border. To the right of the settings list, there are two buttons: 'RESET' and 'SAVE'. The background of the screen features a space-themed image with a planet and stars.

Setting	Value
EIA NUMBER	1
STD NAME	1
STATUS	ENABLE
SIGNAL TYPE	DVB-T2
FREQ	52.50 MHz
MEASURE BW	8.00 MHz

Figure 2-37

2.2.2.5 DTMB

In the channel type of DTMB, the following settings are included as shown in the Figure 2-38.  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **SID NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **FREQ**, Frequency.
- **MEASURE BW**, Bandwidth.



Figure 2-38

2.2.2.6 ANALOG FM

In the channel type of ANALOG FM, the following settings are included as shown in the Figure 2-39. Select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust them.

- **EIA NUMBER**, Digital channel number.
- **SID NAME**, Standard channel number.
- **STATUS**, Channel status.
- **SIGNAL TYPE**, Channel type.
- **FREQ**, Frequency.



Figure 2-39

2.2.2.7 Operation

- **RESET** Select this soft key to restore the factory default setup.
- **SAVE** Select this soft key to save the changes, then the remind dialog box will appear: Are you sure to save the changes? Select 'YES' to save and 'NO' to exist without saving.

2.2.3 Satellite System

The satellite system information includes the following two parts:

- 1) The satellite and receiver (satellite name, longitude, LO OSC, HI OSC).
- 2) The transponder (transponder name, channel status, signal type, polarization, LNB OSC, Frequency (Ku, C), Bandwidth (Code Rate, modulation type, Roll Off, SR)).

2.2.3.1 DVB-S/S2

In the channel type of DVB-S, select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust those parameters above. Refer to Figure 2-40.



CH INFO AP5		AST		00:33:43
SATELLITE	AP5	LONGITUDE	138.0E	SAT +
LO OSC	9750 MHz	HI OSC	10600 MHz	
TP NUM	1	SR	15.000MS/s	SAT -
TP NAME	273	CODE RATE	1/2	TP +
STATUS	ENABLE	MODULATION	QPSK	
SIGNAL TYPE	DVB-S	ROLL OFF	0.35	TP -
DL-Ku	12274 MHz	POLARIZATION	VERT/RIGHT	RESET
MEASURE BW	20.3 MHz	LNB OSC	HIGH	
				SAVE

Figure 2-40

Also, in the channel type of DVB-S2, select  keys (**UP/DOWN**) and Alphanumeric Keypad to adjust those parameters above. Refer to Figure 2-41.



CH INFO AP5		AST		00:33:50
SATELLITE	AP5	LONGITUDE	138.0E	SAT +
LO OSC	9750 MHz	HI OSC	10600 MHz	
TP NUM	1	SR	15.000MS/s	SAT -
TP NAME	273	CODE RATE	1/2	TP +
STATUS	ENABLE	MODULATION	QPSK	
SIGNAL TYPE	DVB-S2	ROLL OFF	0.35	TP -
DL-Ku	12274 MHz	POLARIZATION	VERT/RIGHT	RESET
MEASURE BW	20.3 MHz	LNB OSC	HIGH	
				SAVE

Figure 2-41

2.2.3.2 ANALOG TV



Figure 2-42

2.2.3.3 Operation

- **SAT+** **SAT-** Select these two soft keys to switch the enabled satellite list.
- **TP+** **TP-** Select these two soft keys to switch the current transponder.
- **RESET** Select this soft key to restore the factory default setup.
- **SAVE** Select this soft key to save the changes, then the remind dialog box will appear: Are you sure to save the changes? Select 'YES' to save and 'NO' to exist without saving.

3. Cable&Terrestrial Signal Test

- Channel Measurement
- Constellation diagram
- Spectrum scan
- Channel scan
- Tilt/Level List Measurement
- CNR
- HUM---ANALOG TV
- MOD---ANALOG TV
- EVS---DVB-C
- BER---DVB-C
- MER---DVB-T
- ECHOES
- DTMB GPS
- DVB-T2 Information---DVB-T2

The main menu of CAB&TERR is shown in Figure 3-1.

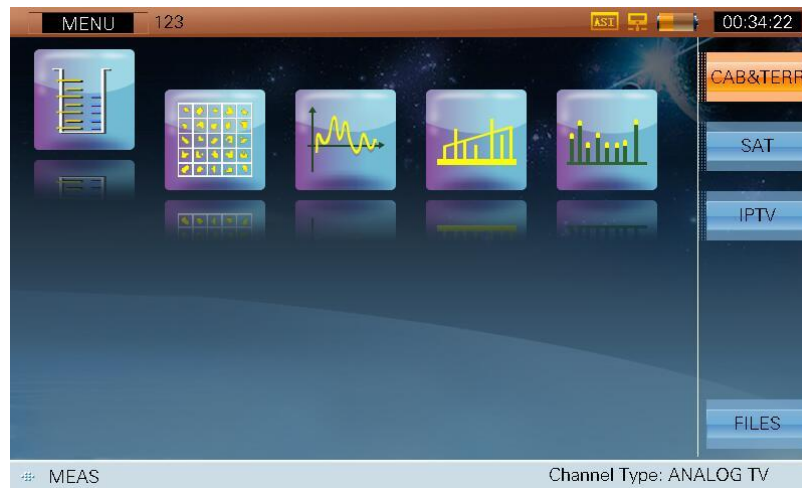


Figure 3-1

The function icons of the main menu are defined as follows:

-  ---- Channel measurement
-  ---- Constellation diagram measurement
-  ---- Spectrum analysis
-  ---- Tilt measurement
-  ---- Channel scanning measurement

Press  keys (**LEFT/RIGHT**) to select the relevant function icons, and you can press  key (**ENTER**) to enter the relevant interfaces.

The name of the current user channel plan displays in the title bar of the CAB&TERR function. Figure 3-1 indicates that the name of the current user channel plan is '123'.

In order to enhance your work efficiency, please create user channel plan before testing. Please press  key (**SETUP**) to enter the setup interface, and then select **F4 (CHANNEL)**. Refer to Figure 3-2.



Figure 3-2

Up to sixteen user plans can be built and saved. The user plans are named as UsrPlan00 - UsrPlan15. Users can define one plan as the current user channel plan and edit the name of the current user channel plan. Users can learn the user channel plan after selecting (See **Section 2: SETUP->CHANNEL->LEARN USER PLAN**).

Users can edit the parameters according to need. Press **i** key (**CH INFO**) to enter the interface of channel setup. Refer to Figure 3-3. Users should press **F6 (SAVE)** to save the setup.



Figure 3-3

3.1 Channel Measurement

The function of Channel Measurement is used to test the basic parameters of the relevant channel types, and the channel types are as follows:

- 1) ANALOG TV
- 2) DVB-C
- 3) DVB-T/T2
- 4) DTMB
- 5) ANALOG FM

Channel Measurement supports for different setup parameters and measurement parameters according to different channel types, as follows:

3.1.1 ANALOG TV

The interface of ANALOG TV Channel Measurement refers to Figure 3-4. It can measure Video level/Audio level/V/A and so on.



Figure 3-4

3.1.1.1 Parameters

- **CH**, Show the channel number of the current channel.
- **VID FREQ**, video frequency (5MHz ~1050MHz).
- **AUD FREQ**, audio frequency (5MHz ~1050MHz).

3.1.1.2 Operation

-  Press the key to enter CNR function directly.
-  Press the key to enter HUM function directly and the function is only enable for ANALOG TV.
-  Press the key to enter MOD function directly and the function is only enable for ANALOG TV.
-  Press the key to enter SEPCTRUM function directly.
-  **ENTER** key, press the key to enter the entry status of parameters and makes the character keys work. Press the key again to confirm the current value input.

3.1.2 DVB-C

The interface of DVB-C Channel Measurement refers to Figure 3-5. It can measure Power level/MER/PRE-BER/POST-BER and so on.



Figure 3-5

3.1.2.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (1MHz ~50MHz).
- **MODE**, modulation type.

When **STD** is J.83A and J.83C, **MODE** is 16QAM, 32QAM, 64QAM, 128QAM and 256QAM;

When **STD** is J.83B, **MODE** is 64QAM and 256QAM;

When **STD** is J.83D, **MODE** is 8VSB and 16VSB.

- **SR**, symbol rate.
When **STD** is J.83A, J.83B and J.83C, **SR** range is from 4 MS/s to 7 MS/s;
When **STD** is J.83D, the fixed **SR** is 10.762 MS/s.
- **STD**, standard (J.83A, J.83B, J.83C, J.83D).

3.1.2.2 Operation

- **VIEW** Press the key to switch the display between Power level/MER/PRE-BER/POST-BER when the current channel type is DVB-C.
- **CONS** Press the key to enter Constellation diagram function directly.
- **BER** Press the key to enter BER function directly.
- **EVS** Press the key to enter EVS function directly (The key works when **STD** is J.83A, J.83B and J.83C.).
- **SPECT** Press the key to enter SEPCTRUM function directly.
- **CNR** Press the key to enter CNR function directly.

3.1.3 DVB-T

The interface of DVB-T Channel Measurement refers to Figure 3-6. It can measure Power level/MER/CBER/VBER and so on.



Figure 3-6

NOTE: The MER displayed on the Channel Measurement interface is the average MER of all carriers.

3.1.3.1 Parameters

- **CH**, channel. Show the number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (6MHz, 7MHz, 8 MHz).
- **MODE**, modulation type (QPSK, 16QAM, 64QAM).
- **GUARD**, guard interval (1/4, 1/8, 1/16, 1/32).
- **CR**, code rate (1/2, 2/3, 3/4, 5/6, 7/8).
- **FFT**, fft mode (2K, 8K).

3.1.3.2 Operation

- **VIEW** Press the key to switch the display between Power level/MER/CBER/VBER when the current channel type is DVB-T.
- **CONS** Press the key to enter Constellation diagram function directly.
- **MER** Press the key to enter MER function directly.
- **ECHOES** Press the key to enter ECHOES function directly.
- **SPECT** Press the key to enter SEPCTRUM function directly.
- **CNR** Press the key to enter CNR function directly.

3.1.4 DVB-T2

The interface of DVB-T2 Channel Measurement refers to Figure 3-7. It can measure Power level/MER/CBER/LBER and so on.



Figure 3-7

3.1.4.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (6MHz, 7MHz, 8MHz).
- **PLP ID**. The default PLP ID is 0. The instrument can get the PLP information automatically when the current channel is locked. When the sum of PLP is above 1, users can edit PLP ID to set up other PLP.

3.1.4.2 Operation

- **VIEW** Press the key to switch the display between Power level/MER/CBER/LBER, when the current channel type is DVB-T2.
- **CONS** Press the key to enter Constellation diagram function directly.
- **SPECT** Press the key to enter SEPCTRUM function directly.
- **T2 INFO** Press the key to enter the function of DVB-T2 parameters.
- **ECHOES** Press the key to enter ECHOES function directly.
- **CNR** Press the key to enter CNR function directly.

3.1.5 DTMB

The interface of DTMB Channel Measurement refers to Figure 3-8. It can measure Level, MER, BER and so on.



Figure 3-8

3.1.5.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (6MHz, 7MHz, 8MHz).

3.1.5.2 Operation

- **VIEW** Press the key to switch the display between Power level/MER/CBER/LBER, when the current channel type is DVB-T2.
- **CONS** Press the key to enter Constellation diagram function directly.
- **ECHOES** Press the key to enter ECHOES function directly.
- **SPECT** Press the key to enter SEPCTRUM function directly.
- **CNR** Press the key to enter CNR function directly.
- **DMTB GPS** Press the key to enter DTMB GPS function directly.

3.1.6 ANALOG FM

The interface of ANALOG FM Channel Measurement refers to Figure 3-9. It can measure Level and so on.

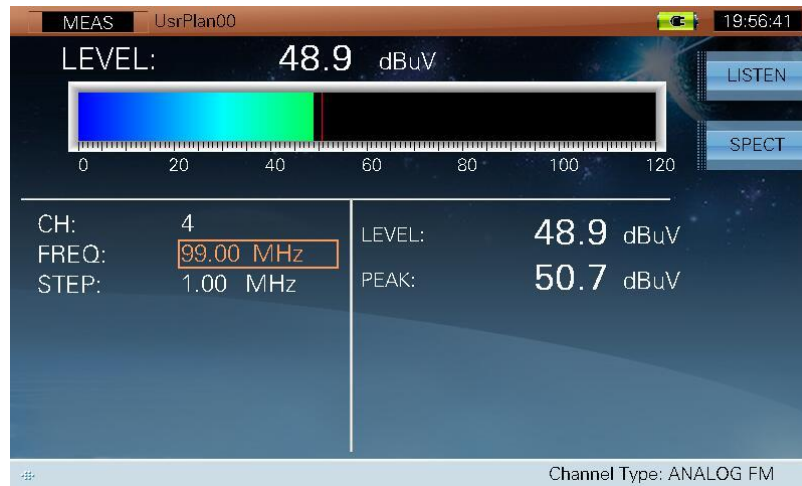


Figure 3-9

3.1.6.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **STEP** (0.01MHz ~10MHz).

3.1.6.2 Operation

- **LISTEN** Press the key to listen to FM intuitively. Users can press  keys (**LEFT/RIGHT**) to adjust the volume. Refer to Figure 3-10.



Figure 3 -10

- **SPECT** Press the key to enter SEPCTRUM function directly.

3.2 Constellation diagram

The constellation diagram function is used for observing the constellation diagram and the relevant parameters of the digital channel. It supports for DVB-C, DVB-T/T2 and DTMB.

3.2.1 DVB-C

The interface of constellation diagram measurement refers to Figure 3-11.



Figure 3-11

The interface also displays the results of MER and BER on the current channel. The constellation diagram supports for the mode 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 8VSB and 16VSB.

3.2.1.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **MODE**, modulation type.

When **STD** is J.83A and J.83C, **MODE** is 16QAM, 32QAM, 64QAM, 128QAM and 256QAM;

When **STD** is J.83B, **MODE** is 64QAM and 256QAM;

When **STD** is J.83D, **MODE** is 8VSB and 16VSB.

- **SR**, symbol rate.

When **STD** is J.83A, J.83B and J.83C, **SR** range from 4 MS/s to 7 MS/s;

When **STD** is J.83D, the fixed **SR** is 10.762 MS/s.

- **STD**, standard (J.83A, J.83B, J.83C, J.83D).

3.2.1.2 Operation

- **REFRESH** Refresh constellation diagram and measurement results.
- **SELECT** Select the quadrant with red checking box. Refer to Figure 3-11.
- **ZOOM+** Press the key to zoom in the quadrant which is selected. Refer to Figure 3-12.



Figure 3-12

- **ZOOM-** Press the key to zoom out the quadrant which is selected.
- **NEXT>>** Press this key to next page as Figure 3-13.



Figure 3-13

- **SPECT** Press the key to enter SEPCTRUM function directly.
- **EVS** Press the key to enter EVS function directly.
- **BER** Press the key to enter BER function directly.
- **MEAS** Press the key to enter Channel Measurement function directly.
- **CNR** Press the key to enter CNR function directly.
- **<<PRE** Press this key to previous page as Figure 3-11.

3.2.2 DVB-T

The interface of constellation diagram measurement refers to Figure 3-14.



Figure 3-14

The interface also displays the results of MER, CBER and VBER on the current channel. The constellation diagram supports for the mode QPSK, 16QAM and 64QAM.

The constellation diagram and MER are relevant to the carrier which is selected to measure. S7000 supports for two kinds of carriers: DATA carrier and TPS carrier.

- 1) The constellation diagram and the average MER of all carriers. Refer to Figure 3-14.
- 2) The constellation diagram of the single carrier and MER of sub carrier. Users need to input the carrier number manually, and S7000 will identify the carrier type automatically.

3.2.2.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (6MHz, 7MHz, 8 MHz).
- **MODE**, modulation type (16QAM, 64QAM, QPSK).
- **GUARD**, guard interval (1/4, 1/8, 1/16, 1/32).
- **FFT**, fft mode (2K, 8K).
- **CARRI**, carriers (When **FFT** is 2K, the carriers range is from 0 to 1704. When **FFT** is 8K, the carriers range is from 0 to 6816.).

3.2.2.2 Operation

- **REFRESH** Refresh constellation diagram and measurement results.
- **SELECT** Select the quadrant with red checking box. Refer to Figure 3-14.
- **ZOOM+** Press the key to zoom in the quadrant which is selected. Refer to Figure 3-15.



Figure 3-15

- **ZOOM-** Press the key to zoom out the quadrant which is selected.
- **CARRIER** The key is used for selecting the display type of constellation diagram (All carriers or Sub carrier). Refer to Figures 3-14, 3-16 and 3-17. Users can input the carrier number manually when the carrier type of constellation diagram is sub carrier. Refer to Figures 3-15 (The carrier type is DATA, the carrier number is 0) and 3-16 (The sub carrier type is TPS, the sub carrier number is 34).



Figure 3-16

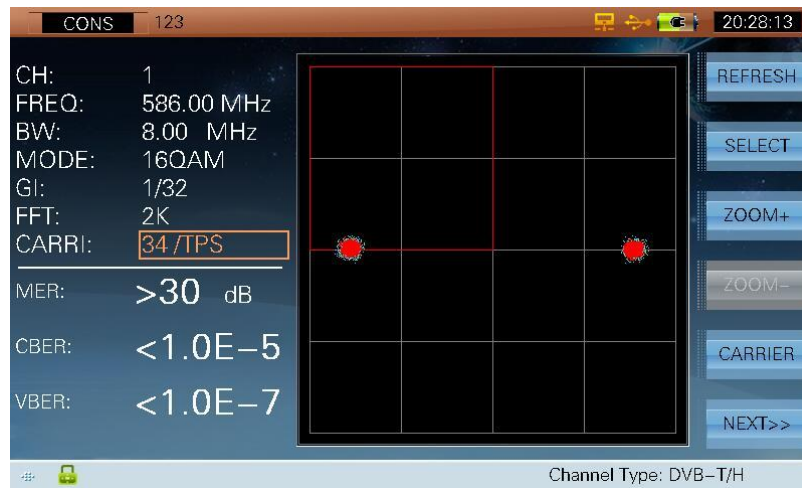


Figure 3-17

➤ **NEXT>>**

Press this key to next page as Figure 3-18.



Figure 3-18

➤ **SPECT**

Press the key to enter SEPCTRUM function directly.

➤ **MER**

Press the key to enter MER function directly.

➤ **ECHOES**

Press the key to enter ECHOES function directly.

➤ **MEAS**

Press the key to enter Channel Measurement function directly.

➤ **CNR**

Press the key to enter CNR function directly.

➤ **<<PRE**

Press this key to previous page as Figure 3-14.

3.2.3 DVB-T2

The interface of constellation diagram measurement is shown in Figure 3-19.



Figure 3-19

The interface also displays the results of MER, CBER and LBER on the current channel. The constellation diagram supports QPSK, 16QAM, 64QAM and 256QAM.

NOTE: The constellation diagram and the measurement parameters displayed on the interface are the data of one PLP layer.

3.2.3.1 Parameters

- **CH**, channel. Show the number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (5MHz, 6MHz, 7MHz, 8MHz).
- **PLP ID**. The default PLP ID is 0. The instrument can get the PLP information automatically when the current channel is locked. When the sum of PLP is above 1, users can modify PLP ID to set PLP.

3.2.3.2 Operation

- **REFRESH** Refresh constellation diagram and measurement results.
- **SELECT** Select the quadrant with red checking box. Refer to Figure 3-19.
- **ZOOM+** Press the key to zoom in the quadrant which is selected. Refer to Figure 3-20.



Figure 3-20

- **ZOOM-** Press the key to zoom out the quadrant which is selected.
- **NEXT>>** Press this key to next page as Figure 3-21.



Figure 3-21

- **SPECT** Press the key to enter SEPCTRUM function directly.
- **MEAS** Press the key to enter Channel Measurement function directly.
- **T2 INFO** Press the key to enter the function of DVB-T2 parameters.
- **ECHOES** Press the key to enter ECHOES function directly.
- **CNR** Press the key to enter CNR function directly.

- **<<PRE** Press this key to previous page as Figure 3-19.

3.2.4 DTMB

The interface of constellation diagram measurement(multiply carrier) is shown in Figure 3-22.



Figure 3-22

The interface also displays the results of MER, BER on the current channel.

3.2.4.1 Parameters

- **CH**, channel. Show the number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).
- **BW**, bandwidth (6MHz, 7MHz, 8MHz).

3.2.4.2 Operation

- **REFRESH** Refresh constellation diagram and measurement results.
- **SELECT** Select the quadrant with red checking box. Refer to Figure 3-22.
- **ZOOM+** Press the key to zoom in the quadrant which is selected. Refer to Figure 3-23.



Figure 3-23

- **ZOOM-** Press the key to zoom out the quadrant which is selected.
- **NEXT>>** Press this key to next page as Figure 3-24.



Figure 3-24

- **SPECT** Press the key to enter SEPCTRUM function directly.
- **ECHOES** Press the key to enter ECHOES function directly.
- **MEAS** Press the key to enter Channel Measurement function directly.
- **CNR** Press the key to enter CNR function directly.
- **DTMB GPS** Press the key to enter DTMB GPS function directly.
- **<<PRE** Press this key to previous page as Figure 3-22.

3.3 Spectrum

S7000's spectrum function can monitor the signal of CAB&TERR. Refer to Figure 3-25.



Figure 3-25

The display spectrum dynamic range is up to 80dB:

- Adjust REF level manually and automatically.
- Adjust SCALE manually and automatically.
- Double Mark, the bottom of screen displays the marker frequency and level.
- Pre-Amplifier adjustment.
- The PEAK function can keep the maximum of all frequency.
- Noise threshold, the system ignores the signal below the threshold.

-
- SPECT 123 01:20:10
- CENT: 586.00 MHz SPAN: 16.00 MHz RBW: 100KHz Scale: 5dB
- REF: -21dBm AVG: OFF TRC: AVG THLD: -50dBm
- AUTO HOLD MARK? PEAK MAX NEXT>>
- 586.00MHz -38.2dBm 589.08MHz -50.6dBm -3.09MHz 12.4dB

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3.3.2 Operation

- **AUTO** Adjust REF and SCALE automatically.
- **HOLD/TRIG** Hold or Trig the measurement.
- **MARK?/MARK A/MARK B/MARK AB** Press the key to switch the marker. Refer to Figures 3-27, 3-28 and 3-29. Users can move the marker by pressing  keys (**LEFT/RIGHT**) to check the measurement results.



Figure 3-27



Figure 3-28



Figure 3-29

- **PEAK** Peak position finding, this function is just enable when enable the marker function. Press the key again to exit this function.
- **MAX** Press the key to open the max hold function. Refer to Figure 3-30.

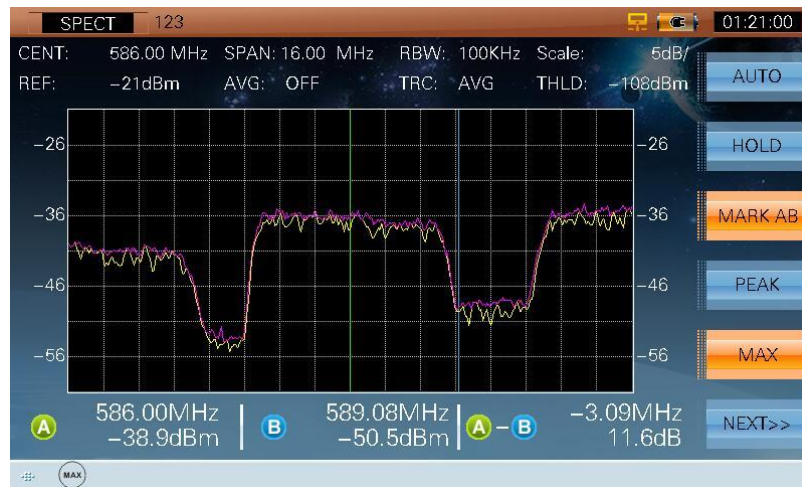


Figure 3-30

- **NEXT>>** Press this key to next page as Figure 3-31.



Figure 3-31



DISPLAY

Press the key to switch Display mode. Refer to Figures 3-32, 3-33, 34 and 35.



Figure 3-32



Figure 3-33

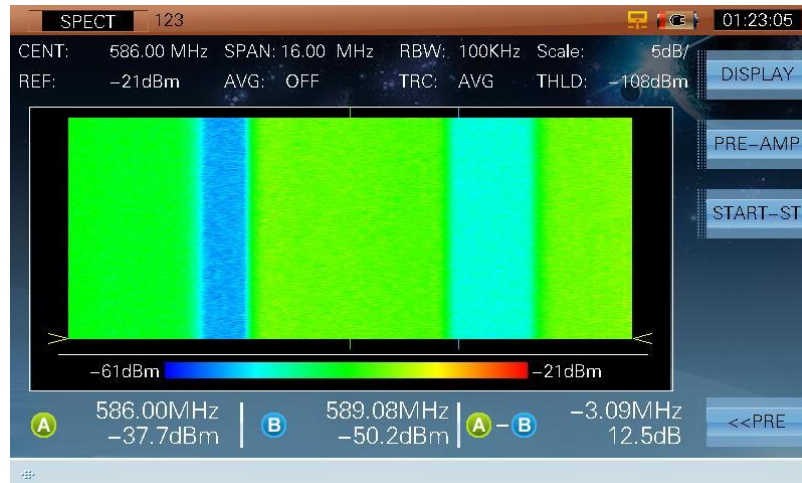


Figure 3-34

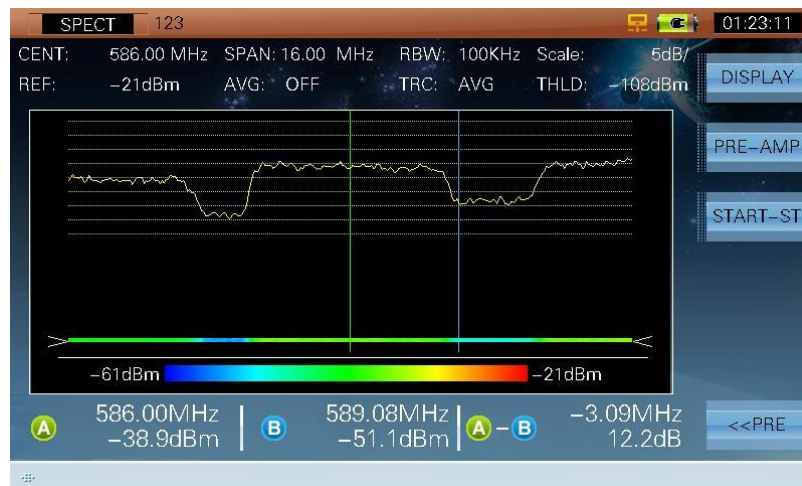


Figure 3-35

- **PRE-AMP** Press the key to take on/off the preamplifier. When you enable it, an icon (▶) will display on the bottom status bar.
- **CENT-SP/START-ST** Switch the display format of frequency.
- **<<PRE** Press this key to previous page as Figure 3-25.
-  They are used to move the marker.
- **OK** Press the key to exit MARK function.

3.4 Channel Scan

S7000 provides with channel scan function in order to test the flatness and amplitude of TV system quickly.

Users can set up the limit value before channel scan (See **Section 2: SETUP->CHANNEL->ANALOG TV/DVB-C/DVB-T LIMIT**). The scan graph of current user plan is displayed as Figure 3-36.

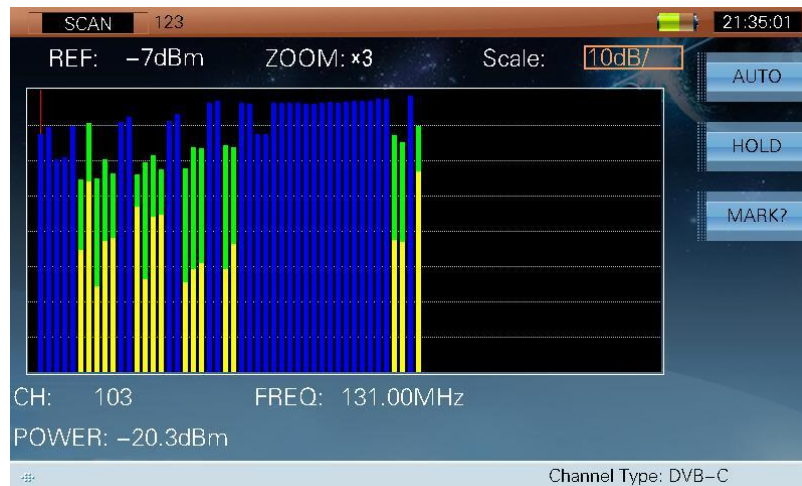


Figure 3-36

S7000 scans the whole channels according to the current user channel plan in the default case (Select user channel plan, see **Section 2: SETUP->MEASURE->SELECT USER PLAN**).

3.4.1 Parameters

- **REF**, reference level (30dBμV -120dBμV).
- **ZOOM** (×1, ×2, ×3, ×4, ×5).
- **SCALE** (1dB/, 2dB/, 5dB/, 10dB/).

3.4.2 Operation

- **AUTO** Press the key to adjust the reference level and scale automatically to get the best testing result.
- **HOLD/TRIG** Hold or Trig the measurement.
- **MARK/MARK*** Users can press  keys (**LEFT/RIGHT**) to move the marker after pressing the key to active marker function. Refer to Figure 3-37.

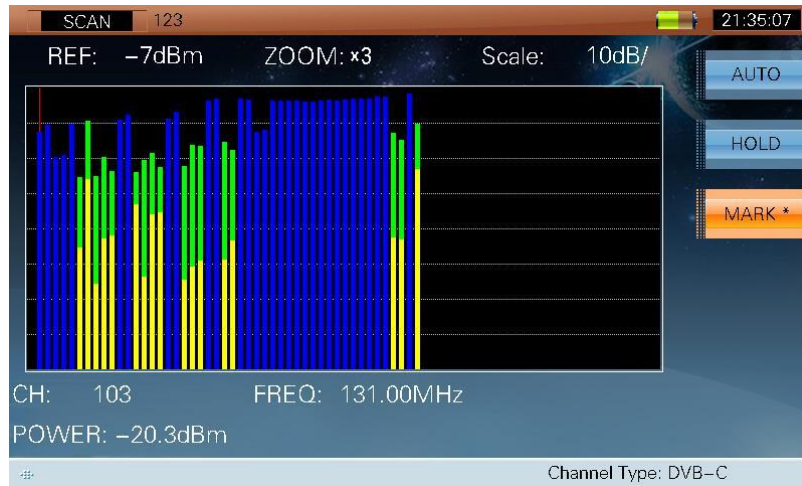


Figure 3-37

3.5 Tilt measurement

Tilt measurement is the effective solution to check the flatness and splitter's gain of cable system, S7000 can get levels of 16 channels and observe the measurement result and graph easily.

Users can set up the tilt channel before measurement (See **Section 2: SETUP->CHANNEL->EDIT TILT PLAN**). Please select at least four channels to test tilt, otherwise it will pop up a dialog box: Please select 4-16 tilt channels!

The interface of tilt measurement is shown in Figure 3-38.

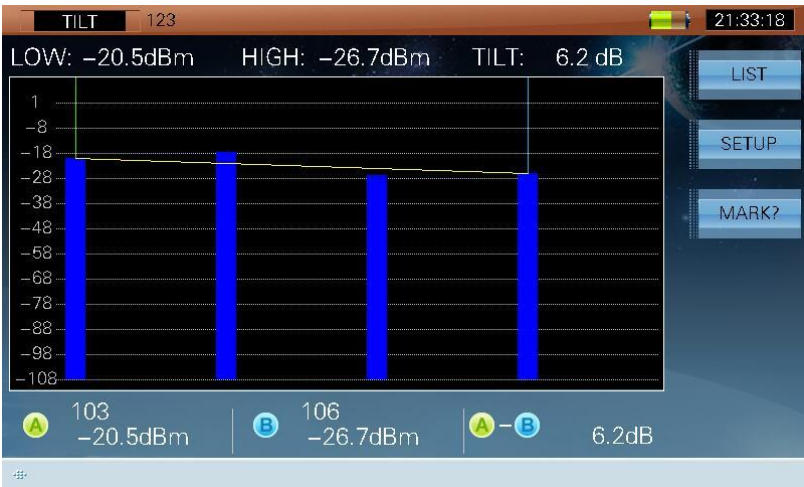


Figure 3-38

The level of tilt channel has two display formats: graph and list.

3.5.1 Operation

- **LIST/TLIT** Graph or List. Refer to Figures 3-38 and 3-39



Figure 3-39

- **SETUP** Press the key to enter the function of tilt setup.
- **MARK?/MARK A/MARK B/MARK AB** Press the key to switch the marker. Refer to Figures 3-40, 3-41 and 3-42. Users can move the marker to check the measurement result.



Figure 3-40

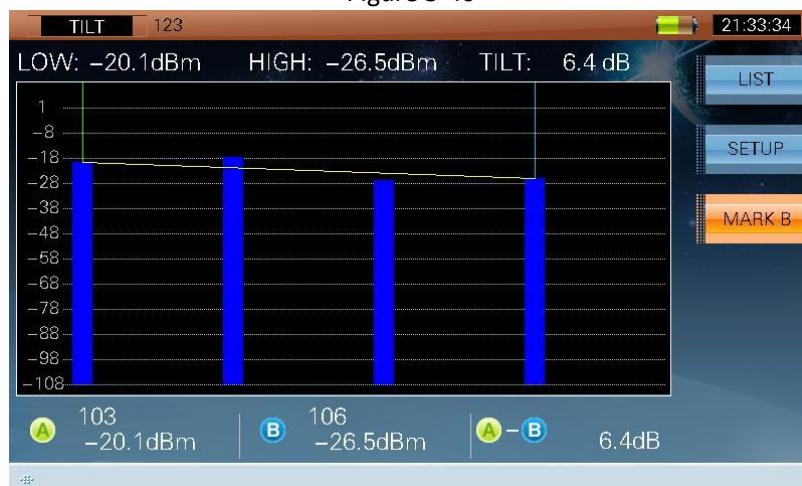


Figure 3-41

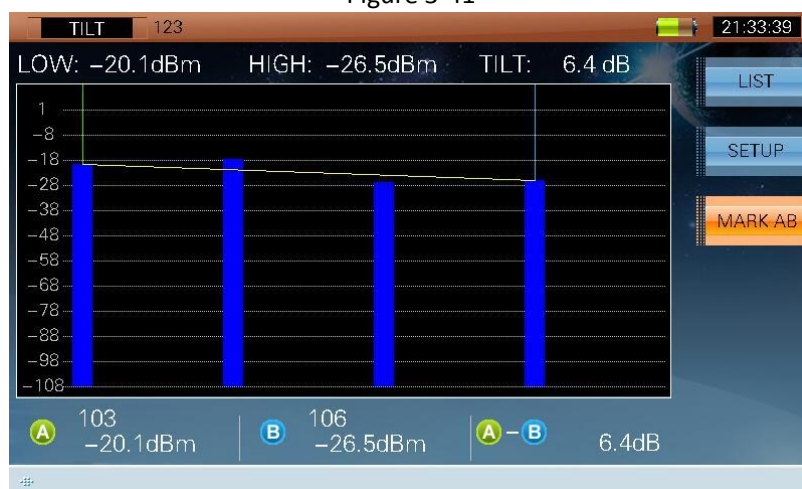


Figure 3-42

-  Press the key to enter SETUP interface directly.

3.6 CNR

The interface of CNR measurement is shown in Figure 3-43.

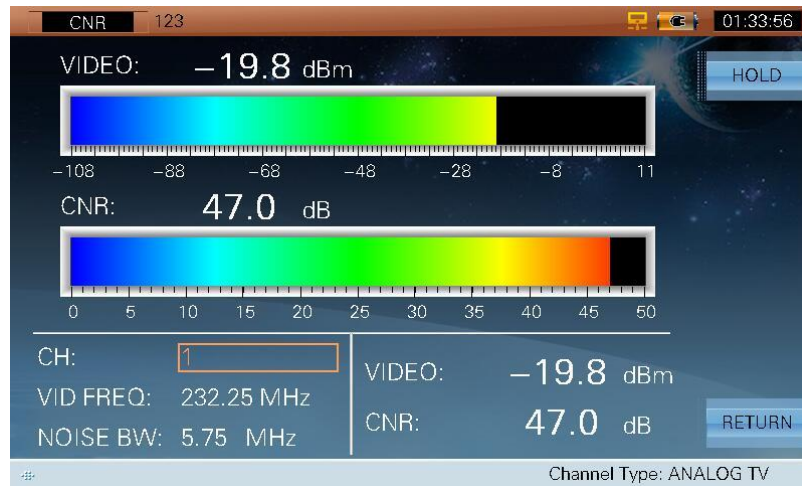


Figure 3-43

3.6.1 Parameters

- **CH**, Show the channel number of the current channel.
- **VID FREQ**, video frequency (5MHz ~1050MHz).
- **NOISE BW**, noise bandwidth (The input range is from 1MHz to 8MHz and the default values are 4.00MHz, 4.75MHz and 5.75MHz).

3.6.2 Operation

- **HOLD/TRIG** Hold or Trig the measurement.
- **RETURN** Press the key to return to the previous interface.

3.7 HUM---ANALOG TV

HUM modulation is also named power hum modulation distortion, which caused by low-frequency interference of the power. Users can set up the hum frequency before measurement (See **Section 2: SETUP->MEASURE->HUM**).

The interface of HUM measurement is shown in Figure 3-44.

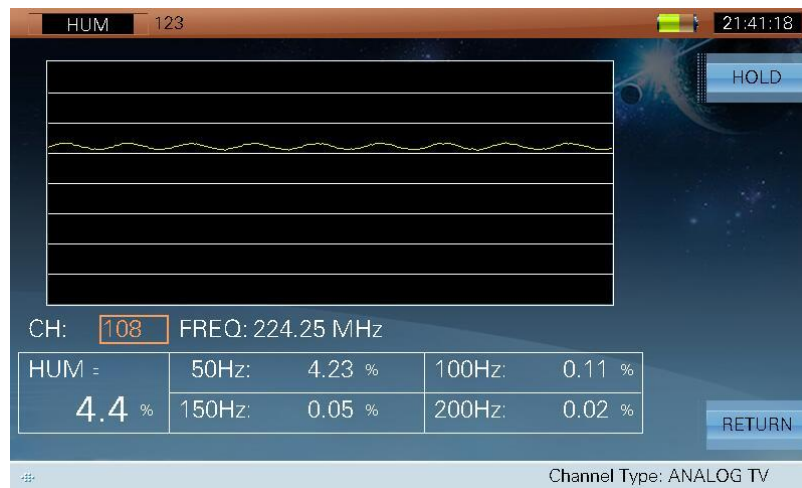


Figure 3-44

3.7.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).

3.7.2 Operation

- **HOLD/TRIG** Hold or Trig the measurement.
- **RETURN** Press the key to return to the previous interface.
-  Press the key to enter the setup interface of HUM frequency directly.

3.8 MOD---ANALOG TV

The interface of MOD measurement is shown in Figure 3-45.

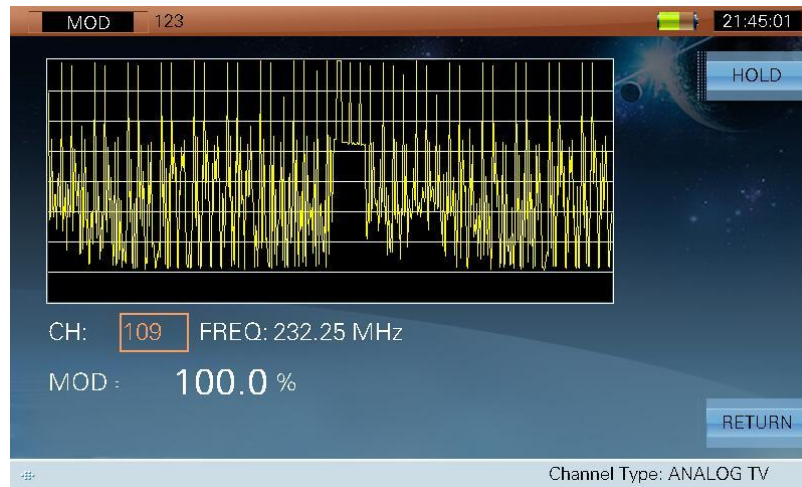


Figure 3-45

3.8.1 Parameters

- **CH**, Show the channel number of the current channel.
- **FREQ**, frequency (5MHz ~1050MHz).

3.8.2 Operation

- **HOLD/TRIG** Hold or Trig the measurement.
- **RETURN** Press the key to return to the previous interface.

3.9 EVS---DVB-C

The interface of EVS measurement is shown in Figure 3-46.

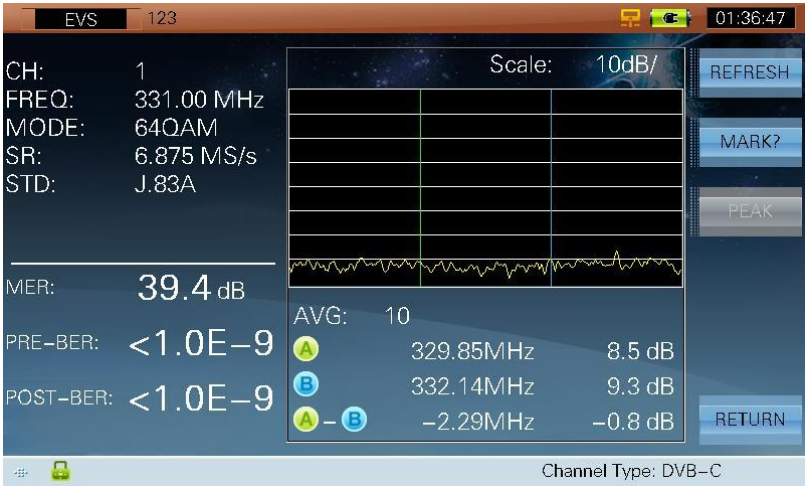


Figure 3-46

The interface of EVS also displays MER and BER of the current channel. EVS supports DVB-C (the signal type), J.83A, J.83B and J.83C (the standard).

3.9.1 Operation

- **REFRESH** Refresh the results.
- **MARK?/MARK A/MARK B/MARK AB** Press the key to select the marker. Refer to Figures 3-47, 3-48 and 3-49. Users can move the marker to check the measurement result.

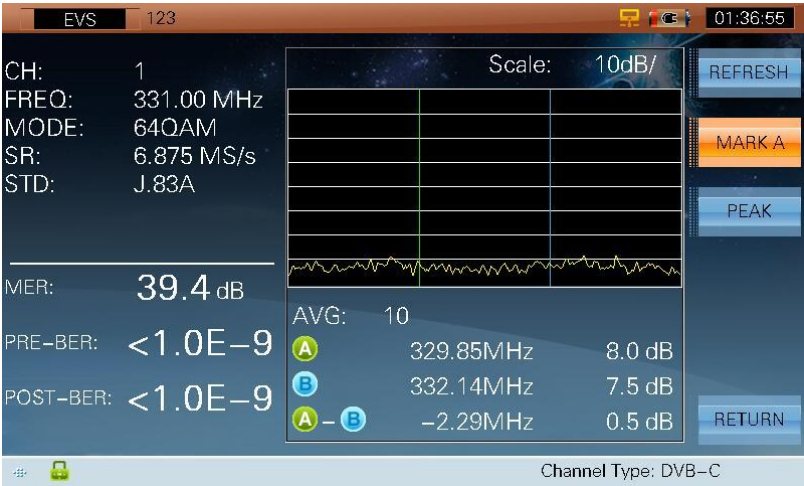


Figure 3-47

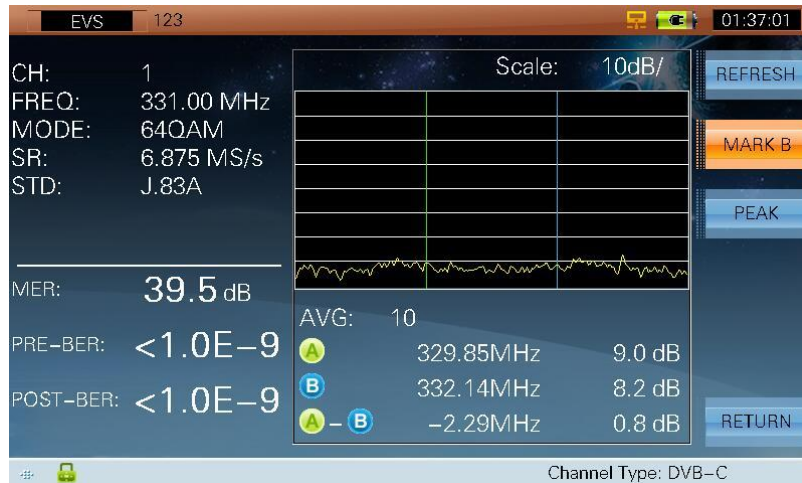


Figure 3-48

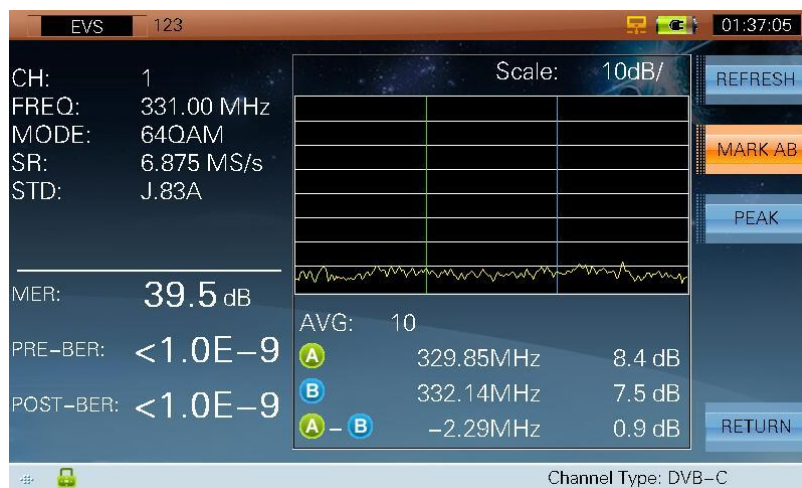


Figure 3-49

- **PEAK** Peak position finding, this function is just enable when enable the marker function. Press the key again to exit this function.
- **RETURN** Press the key to return to the previous interface.

3.10 BER---DVB-C

The interface of BER is shown in Figure 3-50



Figure 3-50

In Figure 3-45, the meanings of abbreviations are as follows:

abbreviations	meaning
ES	Error seconds During 1s, there are one or more mistakes which can be corrected or not be corrected, and then ES plus1.
SES	Serious error seconds During 1s, if the result of the number of errors that can not be correct divided the total bits > 1.1E-3, SES plus1.
COR	Corrected error numbers
UNCOR	Uncorrected error numbers
SUM	Total bits

Table 3-1

3.10.1 Parameter

- **Time** (1min-1440mins).

3.10.2 Operation

- **START/STOP** Press the key to start BER statistics.
- **RETURN** Press the key to return to the previous interface.

3.11 MER---DVB-T

The interface of MER is shown in Figure 3-51.

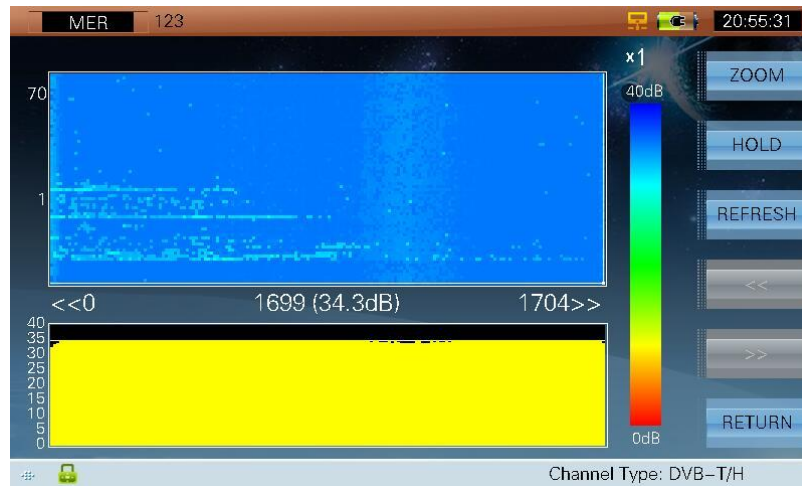


Figure 3-51

The function supports for the signal type DVB-T and it can measure MER up to 70 times. When the carrier type is 2K, the carrier range is from 0 to 1704. When the carrier type is 8K, the carrier range is from 0 to 6816.

3.11.1 Operation

- **ZOOM** Press the key to select the zoom levels (x1, x2, x3, x4, x5). Refer to Figures 3-51 and 3-52.

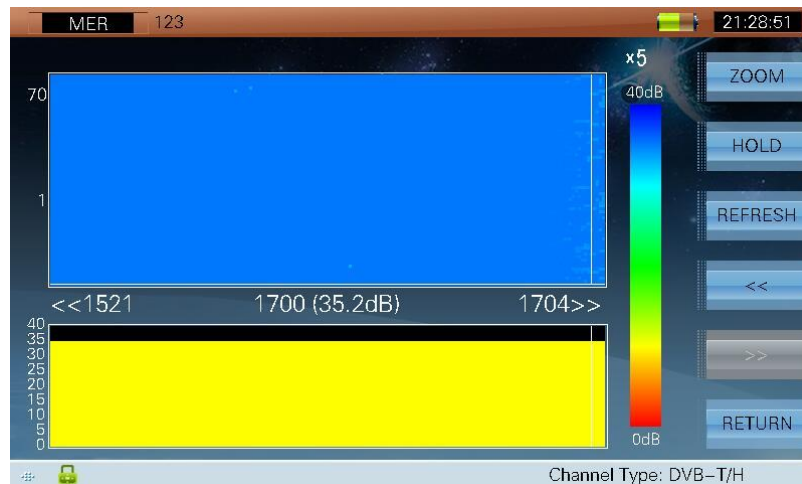


Figure 3-52

- **HOLD/TRIG** Hold or Trig the measurement.
- **REFRESH** Refresh.
- **<<** Press the key to select the carrier range towards the left.
- **>>** Press the key to select the carrier range towards the right.

-  Press the key to return to the previous interface.
-  Press the keys to select the single carrier.
-  Press the keys to adjust the measurement times.

3.12 ECHOES

3.12.1 DVB-T

The interface of ECHOES is shown in Figure 3-53.

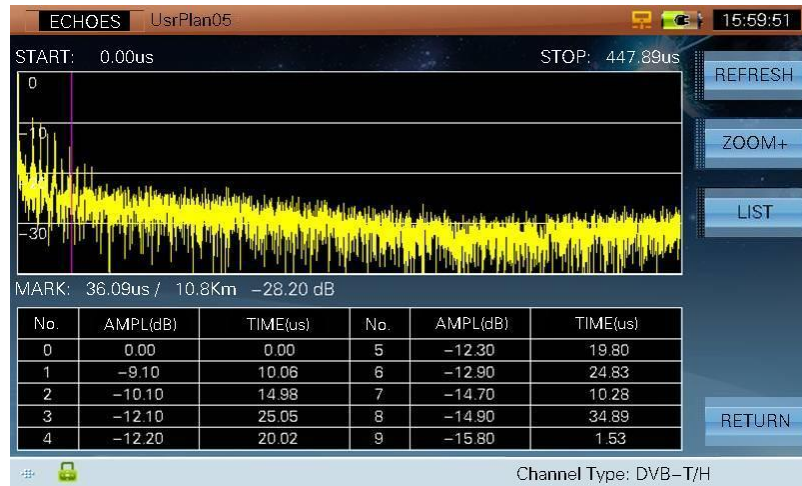


Figure 3-53

- The function supports the signal type DVB-T and the measurement results have two display formats: Curve and List.
- Move the marker to check the measurement results.
- When select the different number in list, the marker on the curve also move correspondingly.

3.12.1.1 Operation

- **REFRESH** Refresh the measurement results.
- **ZOOM+/ZOOM-** Press the key to zoom in the curve. Refer to Figures 3-53 and 3-54.

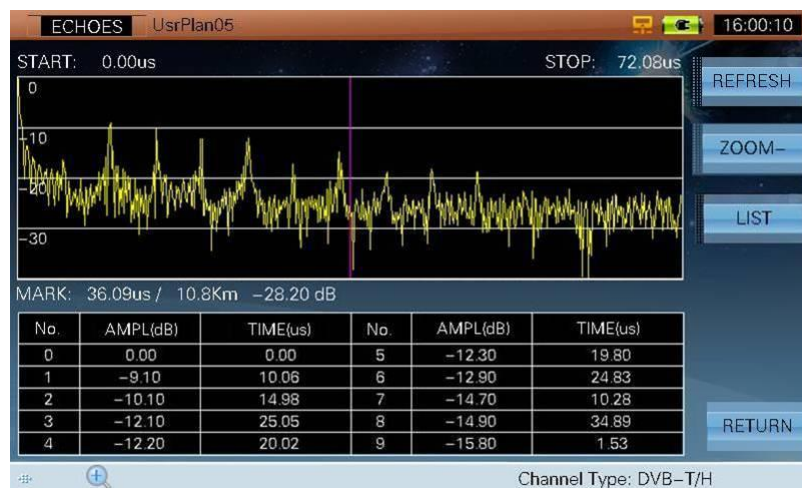


Figure 3-54

➤ **LIST/MARK?** When disable the key, users can press  keys (**LEFT/RIGHT**) to move marker on curve.

When enable the key, users can press  keys (**UP/DOWN/LEFT/RIGHT**) to select numbers in the list and the marker on the curve also move correspondingly. Refer to Figure 3-55.

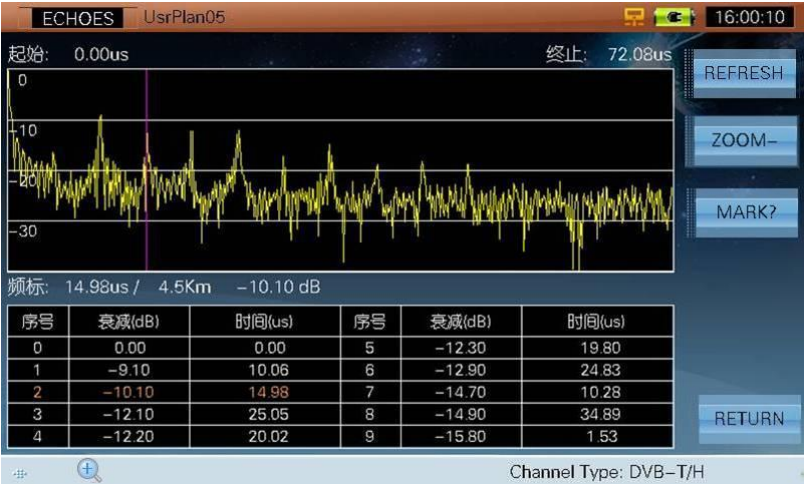


Figure 3-55

➤ **RETURN** Return to the previous interface.

3.12.2 DVB-T2

The interface of ECHOES is shown in Figure 3-56.

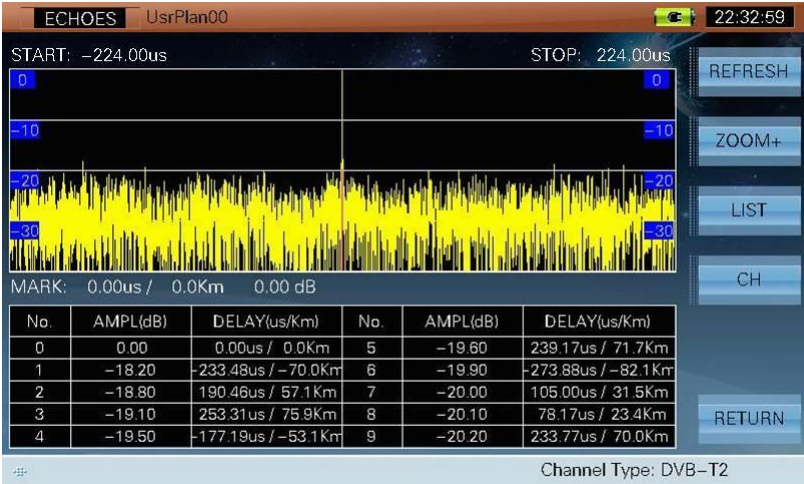


Figure 3-56

- The function supports the signal type DVB-T2 and the measurement results have two display formats: Curve and List.
- Move the marker to check the measurement results.
- When select the different number in list, the marker on the curve also move correspondingly.

3.12.2.1 Operation

- **REFRESH** Refresh the measurement results.
- **ZOOM+/ZOOM-** Press the key to zoom in the curve. Refer to Figures 3-56 and 3-57.

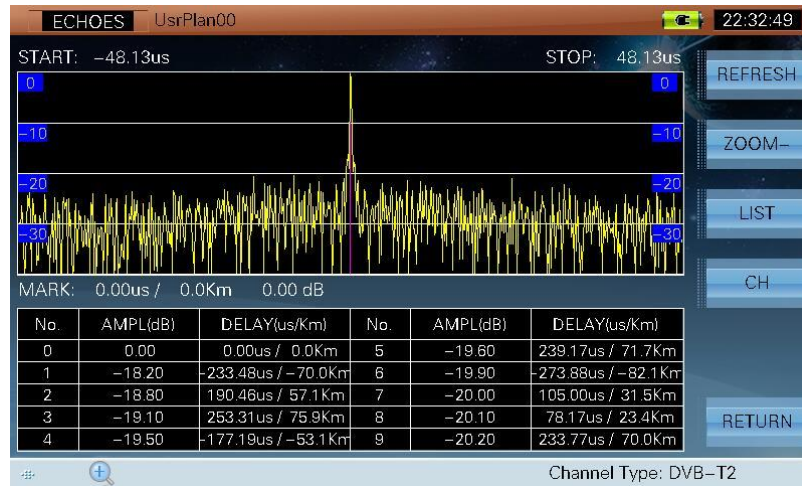


Figure 3-57

- **LIST/MARK** When disable the key, users can press keys (**LEFT/RIGHT**) to move marker on curve.
- When enable the key, users can press keys (**UP/DOWN/LEFT/RIGHT**) to select numbers in the list and the marker on the curve also move correspondingly. Refer to Figure 3-58.

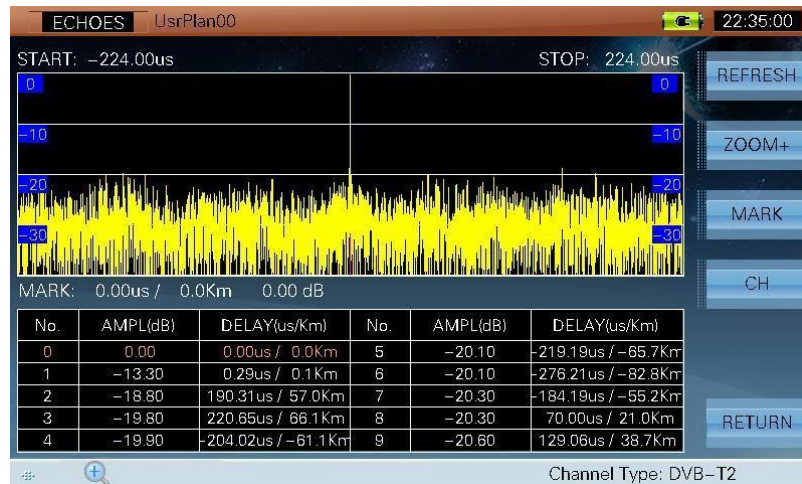


Figure 3-58

- **CH** Press the key to display the current channel information. Refer to Figure 3-59. And users can set up the current channel information.

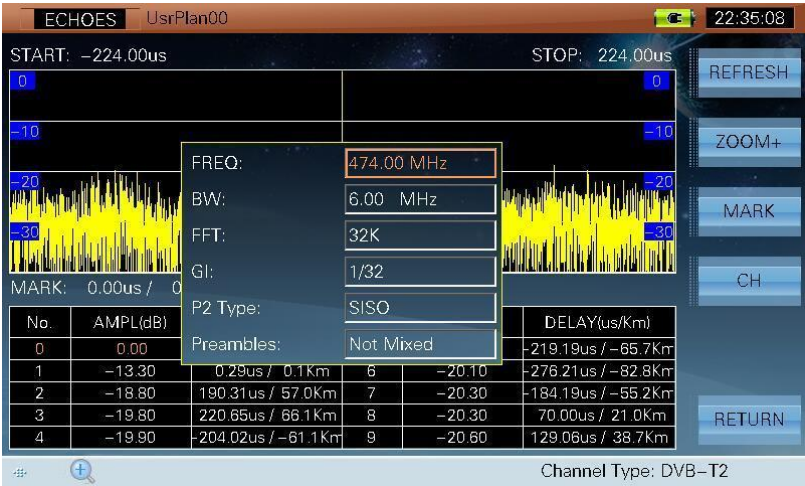


图 3-59

- **RETURN** Return to the previous interface.

3.12.3 DTMB

The interface of ECHOES is shown in Figure 3-60.

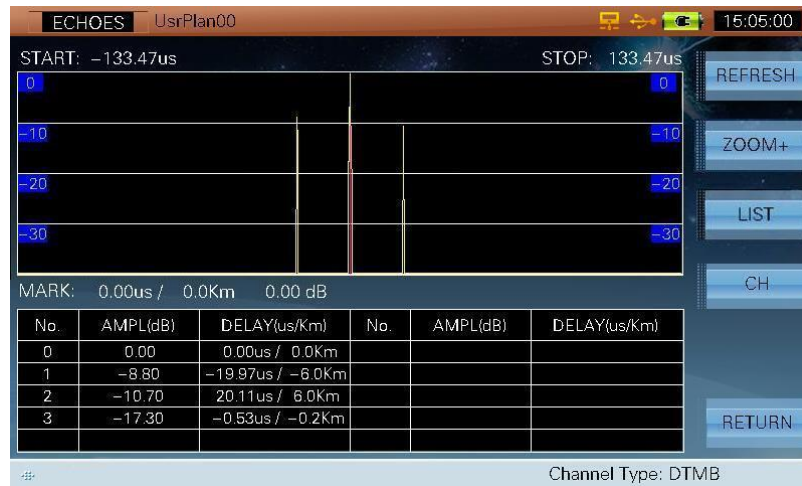


Figure 3-60

- The function supports the signal type DTMB and the measurement results have two display formats: Curve and List.
- Move the marker to check the measurement results.
- When select the different number in list, the marker on the curve also move correspondingly.

3.12.3.1 Operation

- **REFRESH** Refresh the measurement results.
- **ZOOM+/ZOOM-** Press the key to zoom in the curve. Refer to Figures 3-60 and 3-61.

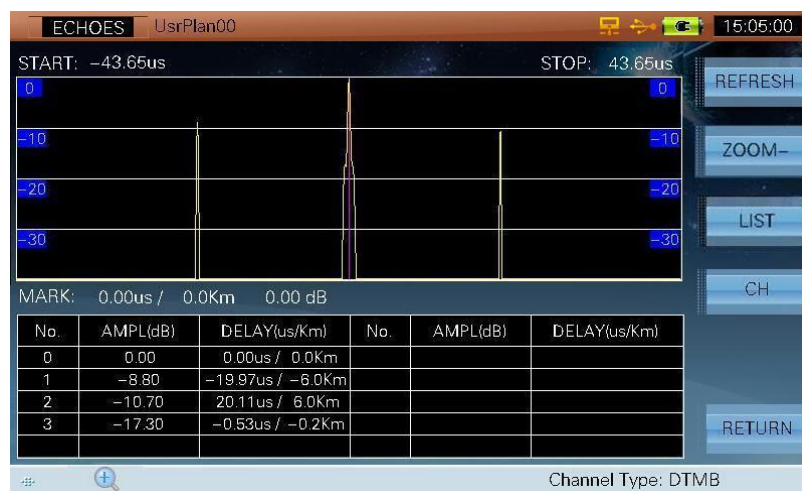


Figure 3-61

➤ **LIST/MARK** When disable the key, users can press  keys (**LEFT/RIGHT**) to move marker on curve.

When enable the key, users can press  keys (**UP/DOWN/LEFT/RIGHT**) to select numbers in the list and the marker on the curve also move correspondingly. Refer to Figure 3-62.



Figure 3-62

➤ **CH** Press the key to display the current channel information. Refer to Figure 3-63. And users can set up the current channel information.



Figure 3-63

➤ **RETURN** Return to the previous interface.

3.13 DTMB GPS

S7000 supports the function of DTMB GPS. Please connect the antenna and GPS module. After S7000 recognizes the GPS module successfully, the interface of DTMB GPS will be shown as Figure 3-64.

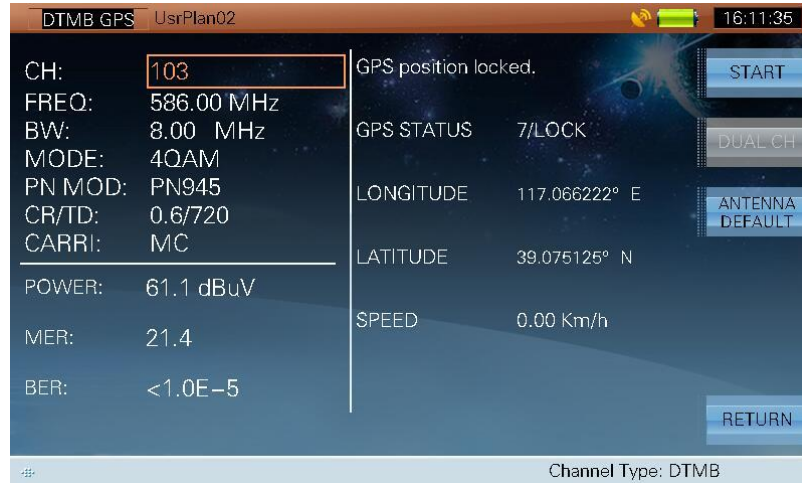


Figure 3-64

S7000 can search satellite information and save the measurement as a file. The instrument saves the file one time per second. You can look over the file that you saved in File Management and export the file using USB device. And you can export the file to map using DriveTest software (Please see the operation on **DriveTest user manual v1.1**).

3.13.1 Operation

- **START** The key is enabled when GPS module attached to S7000 is locked and DTMB signal is locked. Press the key to pop up a message of inputting the name of a file. S7000 will save the measurement as a file(refresh one time per second) after inputting the name. And the key status is **STOP**, refers to figure 3-65. Press the key to switch the measurement.



Figure 3-65

The files format is .dtm and users can look over the files that you saved in File Management.

- **ANTENNA DEFAULT/ANTENNA USER1/ANTENNA USER2/ANTENNA OFF** Press the key to choose the different antenna factors to compensate the measurement data.
- **RETURN** Return to the previous interface.

3.14 DVB-T2 INFO---DVB-T2

The channel parameters are recognized automatically. Users can read the parameters on the interface. Refer to Figures 3-66 and 3-67.



Figure 3-66

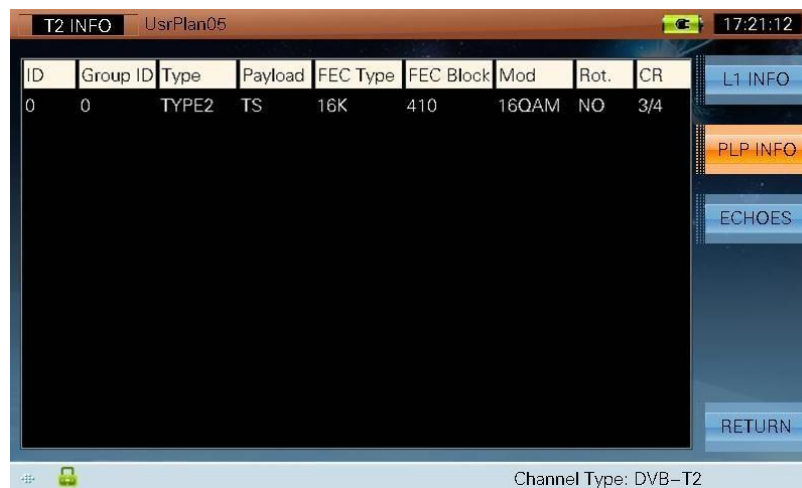


Figure 3-67

3.14.1 Operation

- **L1 INFO** Display the parameters information of L1 layer.
- **PLP INFO** Display PLP list and the parameters relevant to PLP.
- **ECHOES** Press the key to enter ECHOES function directly.
- **RETURN** Return to the previous interface.

4. Satellite Signal Test

- Satellite Transponder Measurement
- Constellation Diagram
- Satellite Spectrum
- Dish Align
- DiSEqC (Digital Satellite Equipment Control)
- CNR

Main menu of satellite system is shown in Figure 4-1.

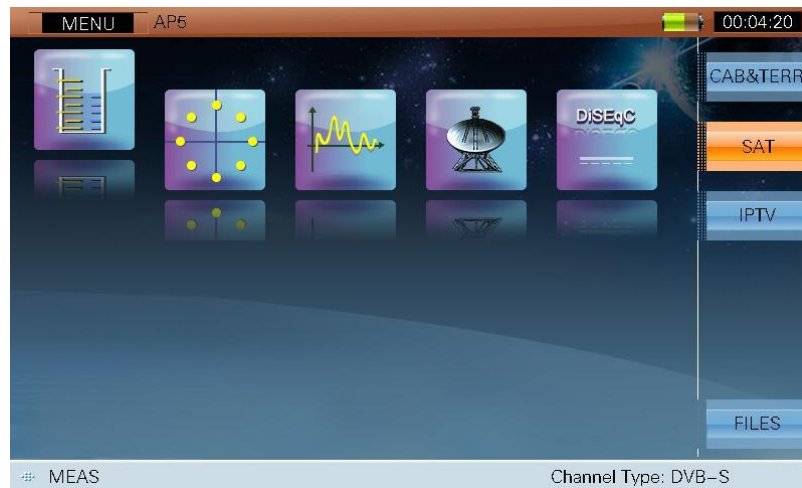


Figure 4-1

The function icons of the main menu are defined as follows:



---- Measurement



---- Constellation diagram measurement



---- Spectrum analysis



---- Dish Align



---- DiSEqC

Press  keys (**LEFT/RIGHT**) to select the relevant function icons, and you can press  key (**ENTER**) to enter the relevant interfaces.

S7000 will display the satellite name in use on the title bar, as shown in Figure 4-1. 'AP5' is the satellite name in use.

Before testing, users need to select the satellite first by press  key (**CH INFO**) and the **CH EDIT** function is as in Figure 4-2. Press **F1 (SAT +)** or **F2 (SAT -)** to switch satellite plans and also press **F3 (TP +)** or **F4 (TP -)** to switch transponders.

In **CH EDIT** interface, user can only switch the satellite plans enabled in satellite list (See **Section 2: SETUP->CHANNEL->SATELLITE LIST**).

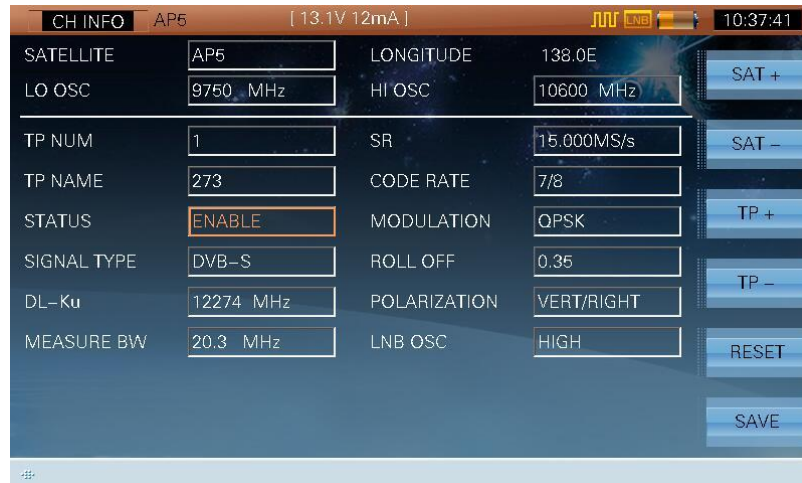


Figure 4-2

Press **F6 (SAVE)** to save the latest setup and press key (**ESC**) or key (**CH INFO**) to return.

For satellite signal testing, LNB need the power feed by receiver or analyzer. For power feed setup, please see **Section 2: SETUP-> INTF. -> LNB POWER**. The interface is as Figure 4-3.



Figure 4-3

Press keys (**UP/DOWN**) and key (**ENTER**) to switch the feed options, and press key (**SETUP**) again to return. When user setup the LNB feed by S7000, the feed status will be displayed on title bar (Icons, feed voltage and current).

Note: If user select 'OFF', S7000 will not supply any power.

4.1 Measurement

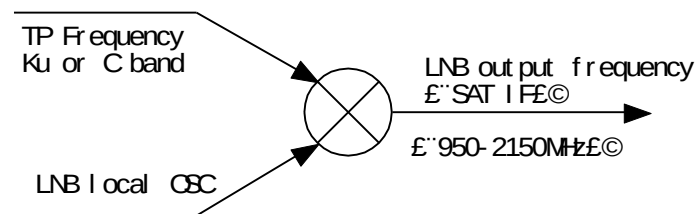
Measurement of satellite transponder(DVB-S) as shown in Figure 4-4, this function can test Power, MER, CBER and VBER.



Figure 4-4

4.1.1 Parameters

- **TP**, name of satellite transponder. User can input a transponder name directly or press  keys (UP/DOWN) to switch transponder.
- **SAT-IF**, the output frequency from LNB, frequency range is from 950MHz to 2150MHz.



- **TP –FREQ**, transponder frequency, S7000 supports two frequency bands:
 - 1) **DL-Ku** band (10.75GHz~12.75GHz).
 - 2) **DL-C** band (3.4GHz~4.2GHz).
- **BW**, bandwidth.
- **SR**, symbol rate. For DVB-S/S2, Symbol rate range is from 1MS/s to 45MS/s.
- **MODE**, Modulation mode. S7000 can recognize automatically, when the signal is locked.

4.1.2 Operation

-  Press the key to switch the display between power, MER, CBER or VBER.
-  Shortcut key to Constellation function.
-  Shortcut key to Dish Align function.
-  Shortcut key to DiSEqC function.
-  Shortcut key to Spectrum function.
-  Shortcut key to CNR function.
-  Shortcut key to power feed control function.

4.1.3 BER Measurement

BER (bit error rate) measured in S7000 are defined below:

- For DVB-S:** CBER (BER before FEC)
 VBER (BER after Viterbi)
- For DVB-S2:** CBER (BER before FEC)
 LBER (BER after LDPC)

4.2 Constellation diagram(DVB-S/S2)

Constellation diagram function as shown in Figure 4-5.

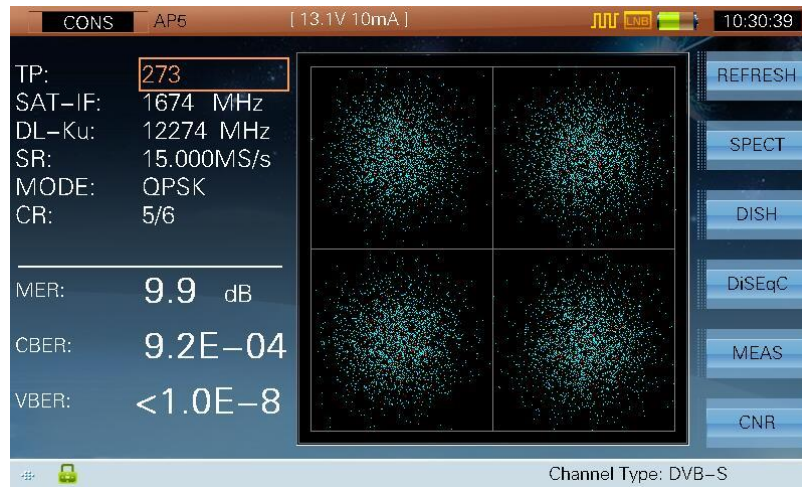


Figure 4-5

Constellation function can display both constellation diagram and MER, BER measurement results. Modulation mode (QPSK, 8PSK) can be support.

4.2.1 Parameters

- **TP**, name of satellite transponder. User can input a transponder name or press  keys (**UP/DOWN**) to switch transponder.
- **SAT-IF**, the output frequency from LNB, frequency range is from 950MHz to 2150MHz.
- **TP-FREQ**, transponder frequency.
- **SR**, symbol rate. For DVB-S/S2, symbol rate range is from 1MS/s to 45MS/s.
- **MODE**, Modulation mode. S7000 can recognize automatically, when the signal is locked.
- **CR**, code rate, S7000 can recognize automatically, when the signal is locked.

4.2.2 Operation

-  Refresh the measurement result and the constellation diagram by manual.
-  Shortcut key to Spectrum function.
-  Shortcut key to Dish Align function.
-  Shortcut key to DiSEqC function.
-  Shortcut key to Measurement function.
-  Shortcut key to CNR function.
-  Shortcut key to power feed control function.

4.3 Spectrum

Spectrum analyzer function allows the user to capture the satellite signals quickly. As shown in Figure 4-6.

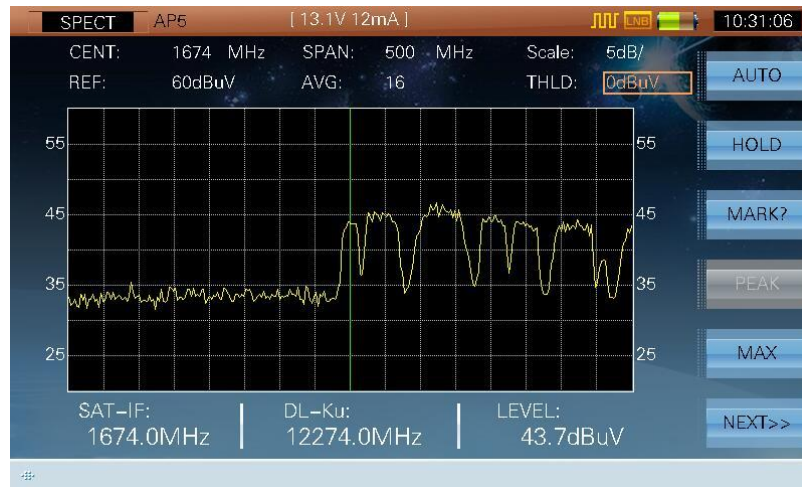


Figure 4-6

- **Display dynamic is range from 8dB to 80dB.**
- **PRE-AMP**, S7000 has a built-in pre-amplifier Default is closed.
- **MAX**, max hold, this function can display the max hold curve of each frequency.
- **DRIVE**, satellite spectrum analyzer support easy operation to drive positioner.
- **DISPLAY**, S7000 supports four display modes.
- **AUTO**, automatic adjust by signal level to get the best view.

4.3.1 Parameters

- **CENT**, centre frequency range is from 955MHz to 2145MHz. If the input frequency is above the range, S7000 will identify if the input frequency is valid C band or Ku band, if valid, S7000 will calculate the SAT-IF automatically.

For example:

Input 1938MHz, 1938MHz is in centre frequency range, this value is valid.

Input 12538MHz, this is a valid transponder frequency in Ku band. If the LNB local osc has been set as 10600MHz, S7000 can calculate the centre frequency is 1938MHz.

Input 6000MHz, this is invalid frequency, so S7000 will give it up and reset the centre frequency to the maximum frequency.

- **SPAN**, spectrum span, (10MHz-1200MHz).
- **Scale**, level scale, (1dB/, 2dB/, 5dB/, 10dB/).
- **REF**, reference level, range is from 20dBμV to 120dBμV. Press  keys (**UP/DOWN**) to adjust, or input digital number key directly.
- **THLD**, noise threshold range is from -20dBμV to 120dBμV, S7000 only display the spectrum above the noise threshold as shown in Figures 4-6 and 4-7.
- **MARK**, Marker, as shown in Figure 4-8.



Figure 4-7

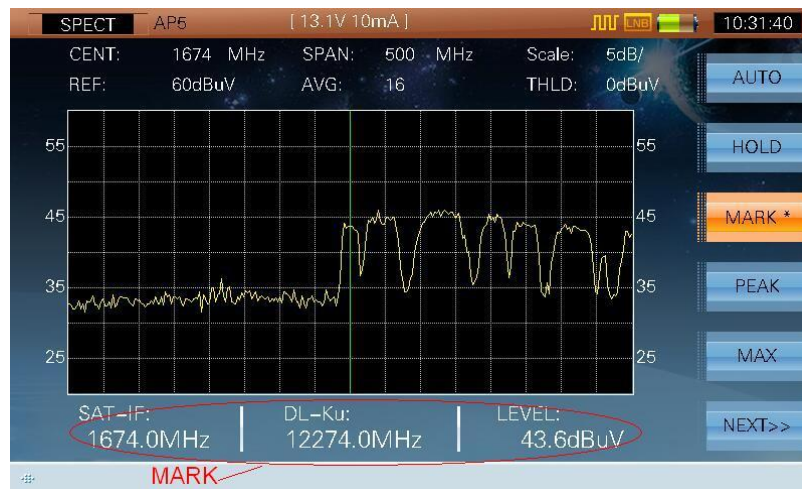


Figure 4-8

4.3.2 Operation

- **AUTO** Automatically adjust the level scale and reference level to get the best view.
- **HOLD/TRIG** Hold or Trig the measurement.
- **MARK?/MARK*** Press this key to enable frequency marker, and then user can move the marker by press  keys (**LEFT/RIGHT**), as shown in Figure 4-8, press this key again to exit this function.
- **PEAK** Peak position finding, this function is just enable when enable the marker function. Press this key will move the marker to the peak level point.
- **MAX** Press this key to open the max hold function as shown in Figure 4-9.

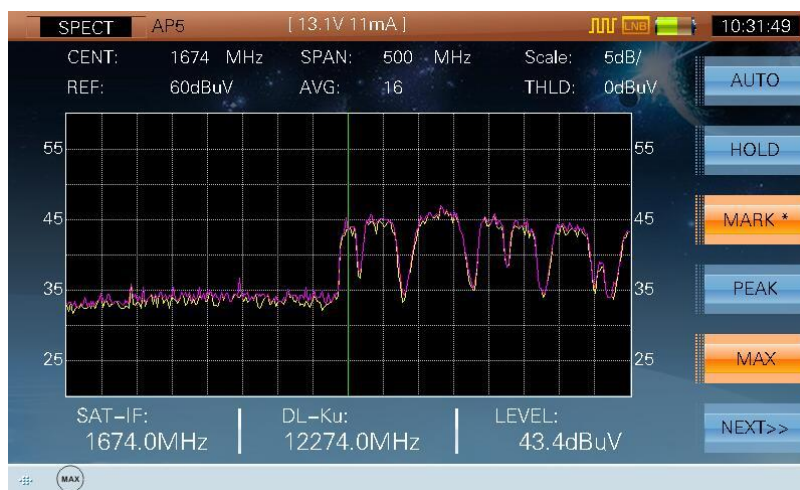


Figure 4-9

- **NEXT>>** Press this key to next page as Figure 4-10.
- **DISPLAY** Press this key to switch display mode, as shown in Figures 4-10, 4-11, 4-12 and 4-13.

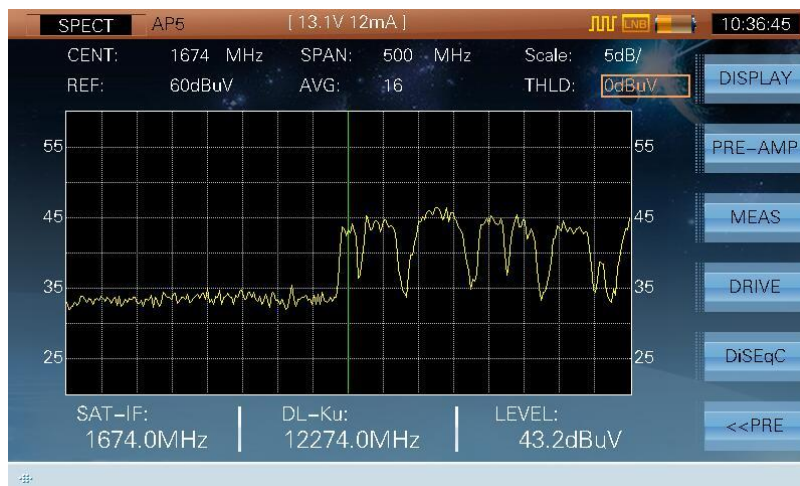


Figure 4-10



Figure 4-11

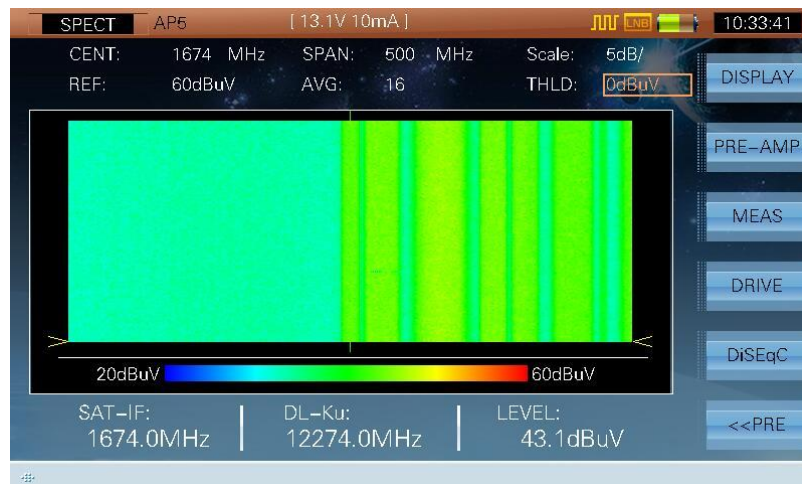


Figure 4-12

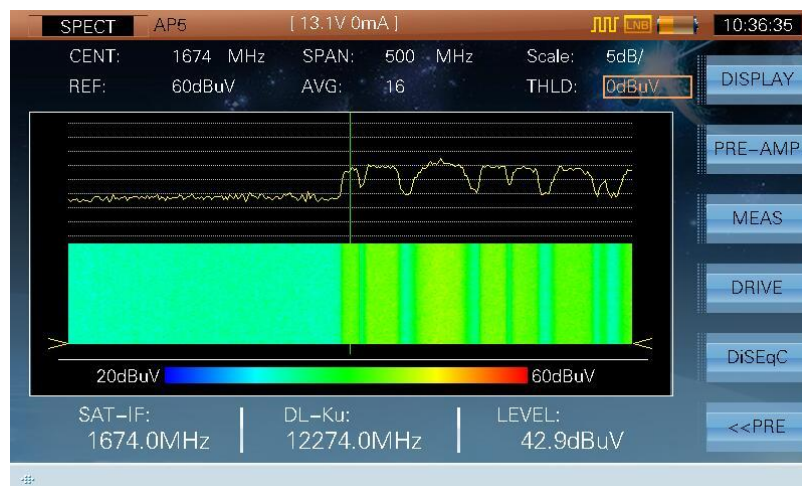


Figure 4-13

- **PRE-AMP** Press the key to take on/off the preamplifier. When enable it, an icon (▶) will display on bottom status bar.
- **MEAS** Shortcut key to satellite transponder measurement function.
- **DRIVE** Press this key will enable the positioner drive function. And then user can drive the positioner by (◀▶) keys (**LEFT/RIGHT**), the positioner will be driven in seconds.
- **DiSEqC** Shortcut key to DiSEqC function.
- **<<PRE** Press this key to previous page as Figure 4-6.
- **OK** The key is used to exit MARK function.

4.4 DISH

Dish alignment function as shown in Figure 4-14. User can use this function to align dish antennas.



Figure 4-14

NOTE: Dish alignment function supports at most 10 transponders. If user select more than 10 transponders, S7000 only measure the first 10 enabled transponders. Otherwise, S7000 measures the whole enabled transponders. Figure 4-14 displays 6 transponders.

S7000 measures the quality and strength of transponders to align the dish.

The dish align step is as follows:

1. Select the target satellite. Refer to Figure 4-14.
2. Setup each transponder enable/disable in **CH INFO** function as shown in Figure 4-15.
3. Setup LNB power supply and GPS.



Figure 4-15

The following parameters may be useful for dish align:



S7000 can setup position information by manual or USB-GPS module(Option). Refer to Figure 4-16.



Figure 4-16



Azimuth (0-180°).

Angle of elevation (0-90°).

Angle of polarization.

Dish alignment function display the testing result in percentage (0%-100%) with different colors as shown in Figure 4-17.

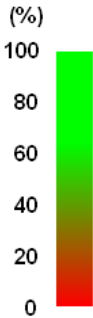


Figure 4-17

4.4.1 Operation

- **SAT**, satellite name and longitude. User can switch between enabled satellites plan. Refer to Figure 4-18.

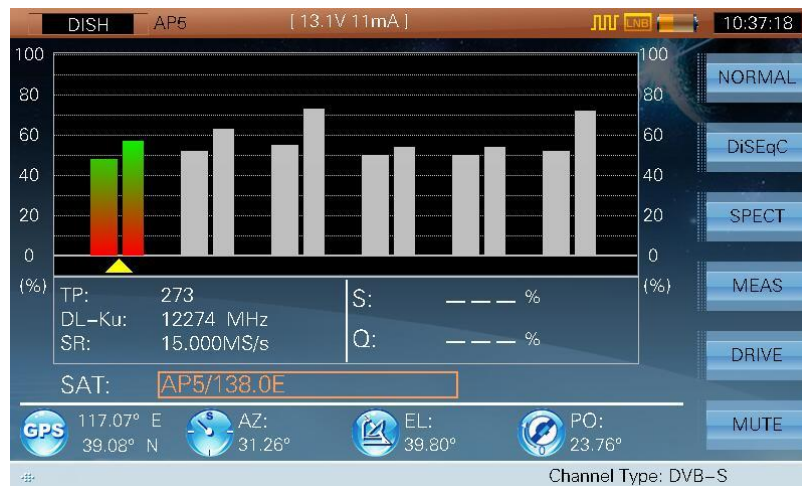


Figure 4-18

- **FIXED/NORMAL** Press this key to fix the selected transponder..
- **DiSEqC** Shortcut key to DiSEqC function.
- **SPECT** Shortcut key to spectrum function.
- **MEAS** Shortcut key to measurement function.
- **DRIVE** Press this key will enable the positioner drive function. And then user can drive the positioner by keys (**LEFT/RIGHT**), the positioner will be driven in seconds. As show in Figure 4-19.



Figure 4-19

- **MUTE** Press this key to make S7000 in mute state, this will shut down the buzzer. Refer to figure 4-20.



Figure 4-20

-  Switch the transponder/drive positioner/adjust buzzer volume.
-  Press these keys to switch the satellite when **SAT** is highlighted.
-  Switch the transponder.
-  Shortcut key to power feed control function.

4.5 DiSEqC

DiSEqC (Digital Satellite Equipment Control) is a communication protocol between the satellite receiver and the devices. S7000 supports DiSEqC 1.0, 1.1, 1.2, 2.X.

DiSEqC & SaTCR control function as shown in Figures 4-21 and 4-22.



Figure 4-21



Figure 4-22

4.5.1 Parameters

DiSEqC (Digital Satellite Equipment Control) command list:

Class	Command	Parameter
General	RESET	----
	STANDBY	----
	POWER ON	----
Switch	SATA/B	A/B
	DiSEqC1.0 SWITCH	1 to 4
	DiSEqC1.1 SWITCH	1 to 16
Positioner	HALT	----
	DISABLE LIMITS	----
	SET LIMIT EAST	----
	SET LIMIT WEST	----
	DRIVE EAST SEC	1 to 127
	DRIVE EAST STEPS	1 to 127
	DRIVE WEST SEC	1 to 127
	DRIVE WEST STEPS	1 to 127
	STORE POSITION	1 to 255
	GOTO POSITION	1 to 255
	GOTO X.X°	-80° to 80°
	GOTO 0	----

Table 4-1

SaTCR command list:

Command	Parameter	Description
SaTCR STATUS	ENABLE /DISABLE	Enable or disable the SaTCR function.
NUM OF SLOTS	2 / 4 / 8	Num of SaTCR LNB channels
SELECT SLOT	0 to 7	Selected SaTCR channel.
SLOT STATUS	ON / OFF	Set the channel status
SaTCR A/B	A / B	Switch SaTCR LNB
SLOT0	950MHz-2150MHz	Channel frequency
SLOT2	950MHz-2150MHz	Channel frequency
----	----	----
----	----	----
SLOT7	950MHz-2150MHz	Channel frequency

Table 4-2

NOTE: S7000 supports 8 slot maximum.

4.5.2 Operation

-  Press this key to switch between DiSEqC and SaTCR.
-  Press  keys (**UP/DOWN**) to select command/parameter.
-  In DiSEqC function, press  keys (**LEFT/RIGHT**) to adjust command parameters.
-  Press this key to send command.
-  Shortcut key to power feed control function.

NOTE: 1. DiSEqC&SaTCR command sending function is disabled, when LNB power is off or in use.

2. When sending DiSEqC&SaTCR command, any key's operation is not active.

4.6 CNR

The interface of CNR measurement is shown in Figure 4-23.

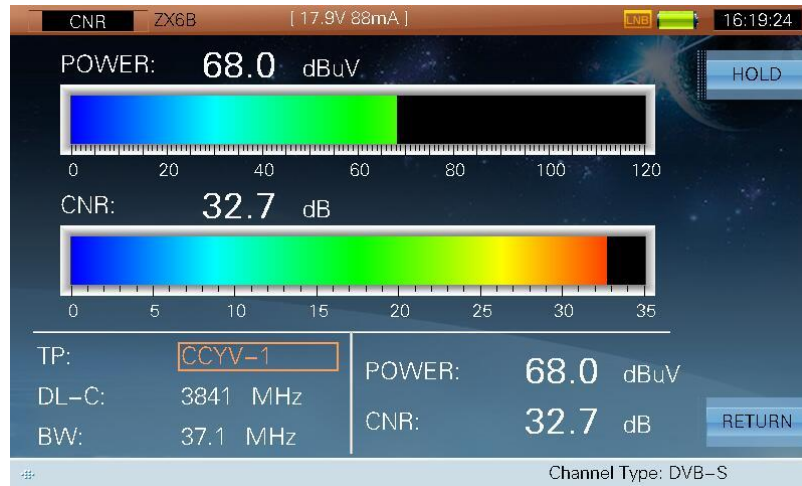


Figure 4-23

4.6.1 Parameters

- **TP**, name of satellite transponder. User can input a transponder name directly or press  keys (**UP/DOWN**) to switch transponder.
- **TP –FREQ**, transponder frequency, S7000 supports two frequency bands:
DL-Ku band (10.75GHz~12.75GHz).
DL-C band (3.4GHz~4.2GHz).
- **BW**, bandwidth (1.4 MHz ~60.8 MHz).

4.6.2 Operation

- **HOLD/TRIG** Hold or Trig the measurement.
- **RETURN** Press the key to return to the previous interface.

5. TS Monitor & Analysis

- Brief introduction of Video Decoder and TS analysis
- RealTime Decoder
- Channel Edit
- TS Recorder
- Playback
- Basic Information
- TR101 290
- PID Viewer
- Program Information
- PCR
- Program List
- PSI/SI
- Data Capture
- Parameters Setting

5.1 Brief introduction

TS analyzer module supports DVB and ATSC standard TS analysis including RealTime TS and Offline TS and also IPTV data. Subfunctions are as follows: RealTime Decoder, Recorder, Channel Edit, Replay, Basic Information, TR101 290, PID Viewer, Program Information, PCR, Program List, PSI/SI, Data Capture and TR101 290 Parameters Setting.

TS function user guide is provided in RF input case.

Press the  key (TV) to start the TS Meas function if the digital channel is selected, and the RealTime subfunction is provided first as default, as Figure 5-1.

5.1.1 Application range

Digital TV installation and debugging: To analysis, test and diagnose.

Digital TV measurement: To measure.

Digital TV transmission detect: To detect.

Digital TV equipment development: To debug and develop the related equipment.

5.1.2 Standards

- MPEG-1
 - 1) ISO-IEC-11172-2(Video)
 - 2) ISO-IEC-11172-3(Audio)
- MPEG-2
 - 1) ISO/IEC 13818-1 (System)
 - 2) ISO/IEC 13818-2 (Video)
 - 3) ISO/IEC 13818-3 (Audio)
 - 4) ISO/IEC 13818-6 (DSM-CC)
 - 5) ISO/IEC 13818-7 (AAC)
- MPEG-4
 - 1) ISO/IEC 14496-2 (Video)
 - 2) ISO/IEC 14496-3 (Audio)
- H264
 - 1) ITU-T H.264
 - 2) ISO/IEC 14496-10 (AVC)
- DVB

5.2 RealTime Decoder



Figure 5-1

This subfunction can decode the program according to the input source of RF, ASI or IPTV. Program information are shown in the list, including program number, CA, service name, provider, service type, video stream type and the video resolution. If the information is not provided in the stream, '---' is shown. Video and audio PID and bitrate are shown of the selected program.  is shown if the program is not encrypted, otherwise  is shown as Figure 5-2.

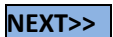


Figure 5-2

5.2.1 Description

- **SID:** the program number in 10 or 16 system according to the Setup.
- **CA:**  stands for not encrypted, and  stands for encrypted.
- **Service Name:** the service name of the program, '---' is displayed if the description is not exist.
- **Provider:** the provider of the program, '---' is displayed if the description is not exist.
- **Service Type:** the brief description of service type of the program.
- **Video Type:** the video type of the program, '---' is displayed if video information is not included in the program.
- **Resolution:** the video resolution, '---' is displayed if the video information is not parsed.
- **Video PID:** the video PID of the selected program.
- **Video Bitrate:** the video bitrate of the selected program.
- **Audio PID1:** the first audio PID of the selected program.
- **Audio Bitrate1:** the first audio bitrate of the selected program.
- **Audio PID2:** the second audio PID of the selected program.
- **Audio Bitrate2:** the second audio bitrate of the selected program.

5.2.2 Operation

-  To select a program.
-  To increase or decrease the volume if decoding.
-  To switch full video screen and small video screen if decoding.
-  To execute RealTime Decoder subfunction, Refer to Figure 5-1.
-  To execute Recorder subfunction to input record file name if the key is enabled, Refer to Figure 5-4.
-  To execute Replay subfunction and show the file list stored in U disk, Refer to Figure 5-6.
The key is disabled if there is no U disk or no TS or TRP file stored in the disk.
-  To execute Channel Edit, Refer to Figure 5-3. The key is disabled if the input source is not RF.
-  Press this key to next page as Figure 5-8.

5.3 Channel Edit



Figure 5-3

5.3.1 Description

To edit channel information briefly, shown as Figure 5-3.

5.4 Recorder



Figure 5-4

5.4.1 Description

To input recorder file name in TS format.

5.4.2 Operation

-  Take the input name '10' for example, the recording file name is '10.ts', and press  key (**ENTER**) to start recode. Refer to Figure 5-5. If the '10.ts' file is already exist, a message box will pop up 'File already exist, replace?' And if there is not enough space left, a message box will pop up 'Not enough disk space!'



Figure 5-5

5.4.3 Description

To display the recording information, including the file name, the recoded file size, left space of the U disk.

NOTE: The recorder files should be saved in the USB device.

5.5 Replay



Figure 5-6

5.5.1 Description

To list maximum 200 files (the file size is less than 3GB) with TS or TRP format. Files name and files size are displayed.

5.5.2 Operation

-  To select a file.
-  For example, the file 'bbc_TV&Radio.ts' is selected. Press  key (**ENTER**) to parse the file and the program information. Refer to Figure 5-7.

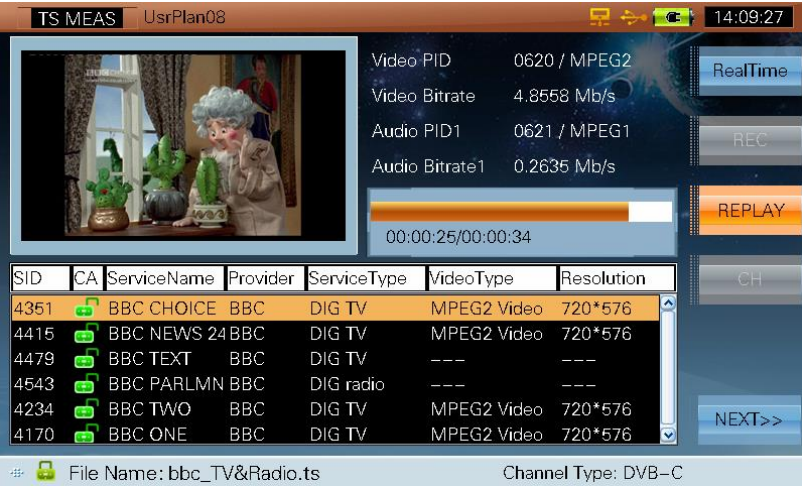


Figure 5-7

5.5.3 Description

To display the information of Replay, including SID, CA, ServiceName, Provider, ServiceType, VideoType, Resolution, Video PID, Video Bitrate, Audio PID and Audio Bitrate.

5.5.4 Operation



To switch full video screen and small video screen if decoding.

5.6 Basic Information

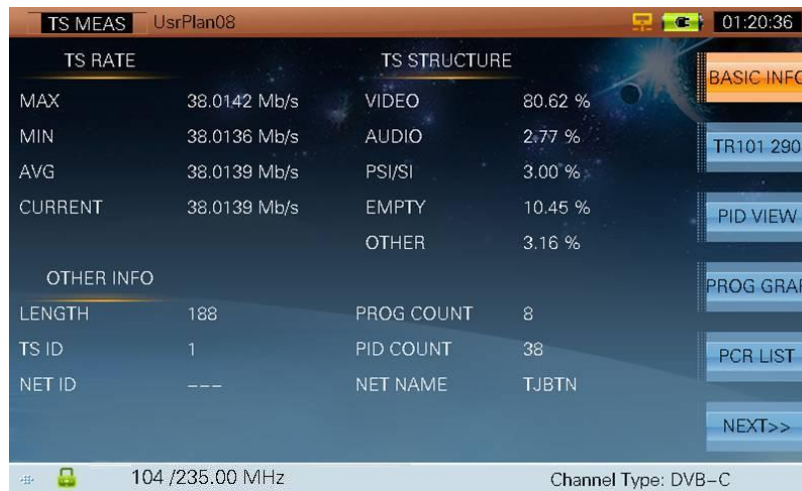


Figure 5-8

5.6.1 Description

This subfunction shows you the basic information of the stream.

- **TS RATE:** Describe the stream transport rate in a second (Mb/s).
- **TS STRUCTURE:** Describe the components of the TS and the rate of every component.
- **OTHER INFO:** Describe the other information of the stream.
- **LENGTH:** The transport length in bytes.
- **PROG COUNT:** Show the total programs.
- **TS ID:** Stream ID.
- **PID COUNT:** The sum of PID of the stream.
- **NET ID:** The PID of NIT indicated by PAT, if not indicated, '---' is displayed.
- **NET NAME:** The provider name, '---' is displayed if not provided in the steam.

5.6.2 Operation

- **BASIC INFO** To execute the BASIC INFO subfunction, shown as Figure 5-8.
- **EVENT INFO/TR101 290** To execute the TR101 290 subfunction. Press this key continuously to switch between TR101 290 and EVENT INFO. Refer to Figure 5-9 and Figure 5-10.
- **PID VIEW** To execute PID VIEW subfunction. Refer to Figure 5-11.
- **PROG GRAP/PROG INFO** To execute the PROG INFO subfunction. To switch PROG INFO and PROG GRAP when this key is continuously pressed. Refer to Figure 5-12 and Figure 5-13.
- **PCR LIST/PCR** To execute the PCR LIST subfunction. To switch PCR and PCR LIST when this key is continuously pressed. Refer to Figures 5-14 and 5-15.
- **NEXT>>** Press this key to next page as Figure 5-18.

5.7 TR101 290



Figure 5-9

5.7.1 Description

The first table lists a basic set of parameters which are considered necessary to ensure that the TS can be decoded.

The second table lists additional parameters which are recommended for continuous monitoring.

The third table lists optional additional parameters which could be of interest for certain applications. Parameter buff is not included because of the limit of hardware capacity.

5.7.2 Operation

-  To reset to monitor the stream and clear the result.

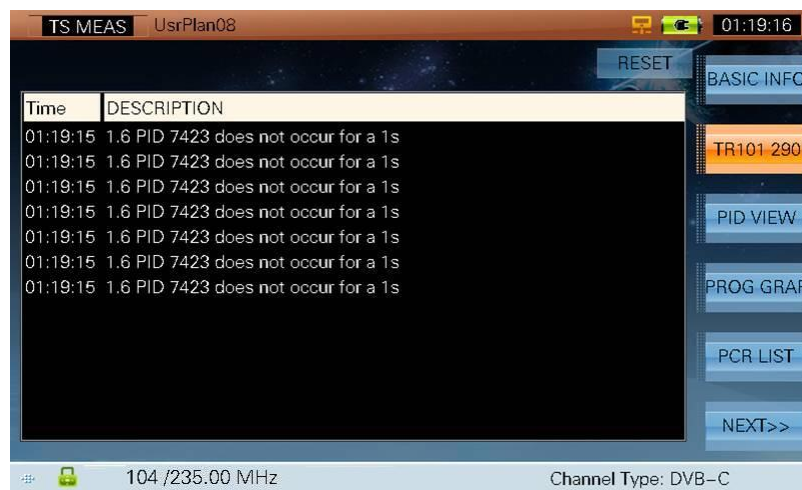


Figure 5-10

5.7.3 Description

It describes the detailed information, including the record time, the standard number.

5.7.4 Operation

-  To reset to monitor the stream and clear the result.
-  To page up and page down.

5.8 PID View



Section	Simplified Info	Value(%)	PID	CR(Mbps)
TS	TS Info	100	---	38.014
PSI/SI	Info	3.002	---	1.141
-	PAT	0.040	---	0.015
-	PMT-22151	0.040	0257	0.015
-	PMT-22152	0.040	0258	0.015
-	PMT-22157	0.040	0259	0.015
-	PMT-22160	0.040	0260	0.015
-	PMT-22161	0.040	0261	0.015
-	PMT-22162	0.040	0262	0.015
-	PMT-22163	0.040	0263	0.015
-	PMT-22850	0.040	0197	0.015
-	CAT	0.040	0001	0.015
-	NIT	0.045	0016	0.017
-	TDT/TOT	0.004	0020	0.002
-	SDT/BAT	0.182	0017	0.187

104 / 235.00 MHz Channel Type: DVB-C

Figure 5-11

5.8.1 Description

It describes the information with section, simplified information, value, PID and the CR of every PID of the stream.

- **Section:** the PID type.
- **PID:** the PID value.
- **CR:** the bitrate of the PID.

The Value and CR are calculated within a second.

5.8.2 Operation



To page up and page down.

5.9 Program Information



Figure 5-12

5.9.1 Description

This function parses the information from audio and video ES. It supports MPEG-1/2/4, H.264 video format and MPEG-1/2/4, AAC audio format. At most two audio information can be displayed.

It lists the SID, CA, bitrate, service name, provider, service type in the below list. And the video/audio information of selected program is above. The parameters may be different according to the audio/video format. If the parameter is not parsed '---' will be displayed. If the program has no video information, a message box with 'No video data.' will pop up.

5.9.2 Operation



To select a program and list the audio and video information of the selected program.

5.9.3 Description

To display the program information with SID, CA, bitrate, service name, provider, service type. The yellow curve is the video BW rate curve if video information included in the program. The green curve is the first audio BW curve if audio information included in the program. The abscissa is on behalf of the rate of the current time, and the ordinate is on behalf of BW percent of the program. If the program is not a digital TV program, no curve will be displayed.

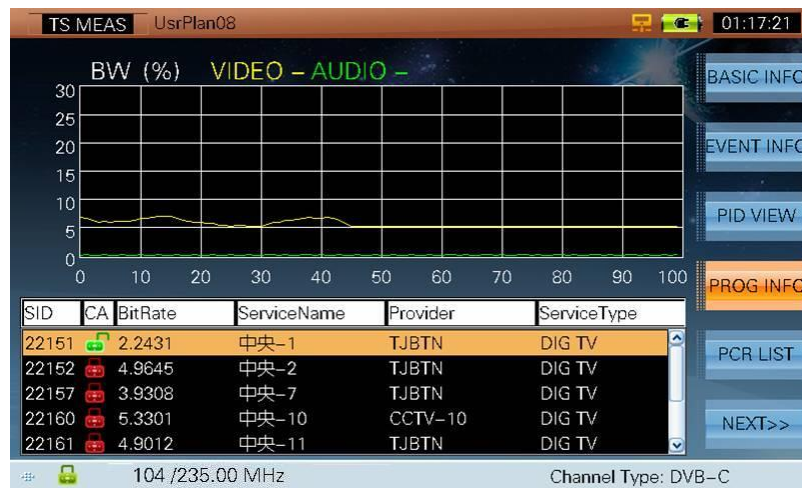


Figure 5-13

5.9.4 Operation

-  To selected the program and display the BW rate curve.

5.10 PCR

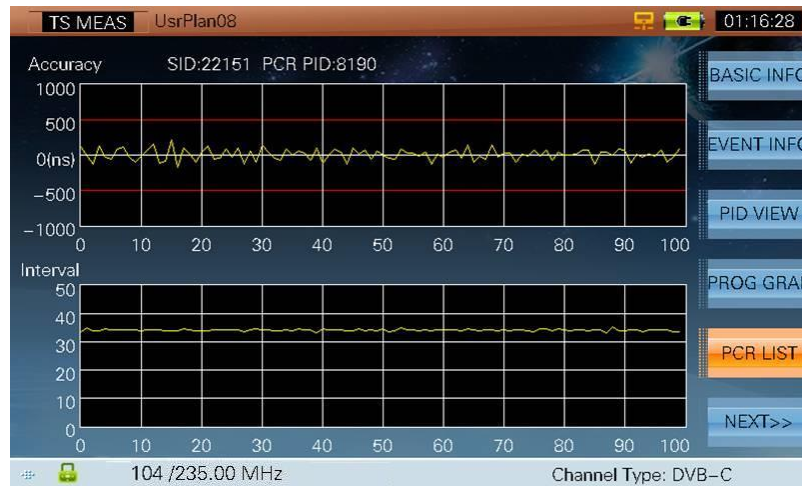


Figure 5-14

5.10.1 Description

To display the PCR accuracy and PCR interval of the selected program. Refer to Figure 5-14.

Figure 5-15 shows the detailed PCR information. If the PCR does not exist, '---' is displayed. Different programs can have the same PCR and every program can have its PCR. PCR accuracy of selected program is within ± 500 ns and PCR interval of the selected program is from 0 ms to 40 ms. The scale can be set in PARAM SET function.

5.10.2 Operation



To select a program and show the PCR accuracy curve and PCR interval curve.

SID	PCR_PID	Min AC(ns)	Max AC(ns)	Min Interval(ms)	Max Interval(ms)
22151	8190	-234.517	200.625	32.443	36.083
22152	8190	-234.517	200.625	32.443	36.083
22157	8190	-234.517	200.625	32.443	36.083
22160	8190	-234.517	200.625	32.443	36.083
22161	8190	-234.517	200.625	32.443	36.083
22162	8190	-234.517	200.625	32.443	36.083
22163	8190	-234.517	200.625	32.443	36.083
22850	---	---	---	---	---

Figure 5-15

5.10.3 Description

Figure 5-15 shows the detailed PCR information, including PCR PID, min accuracy, max accuracy, min interval, and max interval. If the PCR does not exist, '---' is displayed.

5.10.4 Operation



To select a program.

5.11 Program List

No.	FREQ	CA	ServiceName	Provider	ServiceType	TYPE/SR(MS/s)
1	227		区县1	TJBTN	DIG TV	64QAM/6.875
2	227		区县2	TJBTN	DIG TV	64QAM/6.875
3	227		区县3	TJBTN	DIG TV	64QAM/6.875
4	227		区县4	TJBTN	DIG TV	64QAM/6.875
5	235		中央-1	TJBTN	DIG TV	64QAM/6.875
6	235		中央-2	TJBTN	DIG TV	64QAM/6.875
7	235		中央-7	TJBTN	DIG TV	64QAM/6.875
8	235		中央-10	CCTV-10	DIG TV	64QAM/6.875
9	235		中央-11	TJBTN	DIG TV	64QAM/6.875
10	235		中央-12	TJBTN	DIG TV	64QAM/6.875
11	235		中央音乐	TJBTN	DIG TV	64QAM/6.875
12	235		广告1	TJBTN	user defined	64QAM/6.875
13	243		广东卫视	TJBTN	DIG TV	64QAM/6.875
14	243		甘肃卫视	TJBTN	DIG TV	64QAM/6.875
15	243		重庆卫视	TJBTN	DIG TV	64QAM/6.875

Figure 5-16

5.11.1 Description

To list the programs information in ascending order of frequency of the current transport network.

If it's cable system, it lists program number, frequency, CA, service name, provider, service type, modulation type/SR(MS/s).

If it's satellite system, it lists program number, frequency, CA, service name, provider, service type, modulation type/SR(MS/s), and the polarization.

If it's terrestrial system, it lists program number, frequency, CA, service name, provider, service type, modulation type/FFT/GUARD.

Because of the encoding method, some provide the program information of the current frequency, and some provide the program information of all frequencies, so the program information may be different.

The CA may be different from RealTime subfunction, PROG INFO subfunction cause of the different way of getting the CA value. The CA of this subfunction is got from TS directly.

5.11.2 Operation

- **PROG LIST** To execute PROG LIST subfunction. Refer to Figure 5-16.
- **PSI/SI** To execute PSI/SI subfunction. Refer to Figure 5-17.
- **CAPTURE** To execute CAPTURE subfunction. Refer to Figure 5-18.
- **PARAM SET** To execute PARAM SET subfunction. Refer to Figure 5-19.
- **<<PRE** Press this key to previous page.

5.12 PSI/SI

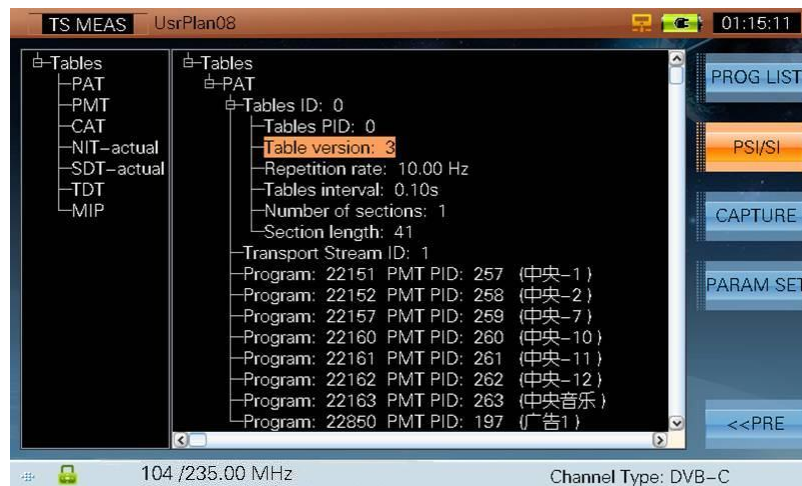


Figure 5-17

5.12.1 Description

Figure 5-17 shows the PSI/SI information of the stream. The left table lists the tables such as PAT, PMT, CAT and the right lists the detailed information according to the select table.

5.12.2 Operation

-  To select a table and show the detailed information in right table.
-  To select the table.
-  To select a table and show the detailed information in right table.
-  To return to the left table and set the left table focused on Exit TS Meas function and return to previous function if the focus is on the left table.

5.13 Capture



Figure 5-18

5.13.1 Description

To capture data according to the selected PID and display the data in the right box.

5.13.2 Operation

Focus Position			
VIDEO	Move focus	Move focus	To get PID
AUDIO	Move focus	Move focus	To get PID
PCR	Move focus	Move focus	To get PID
PSI/SI	Move focus	Move focus	To get PID
ECM/EMM	Move focus	Move focus	To get PID
DATA	Move focus	Move focus	To get PID
PID	Move focus	---	To display the PID list of the selected data
Capture Num	Move focus	---	To start or stop input. The num is from 0 to 255.
START	Move focus	Move focus	To capture stream data according to the capture num and the data type if data is transport.
STOP	Move focus	Move focus	To stop to capture
CLEAR	Move focus	Move focus	To clear the captured data.
Captured data list	Select the num N data, and show the information in the right box	To show the first and second page data	---

5.14 Parameter Setting



Figure 5-19

5.14.1 Description

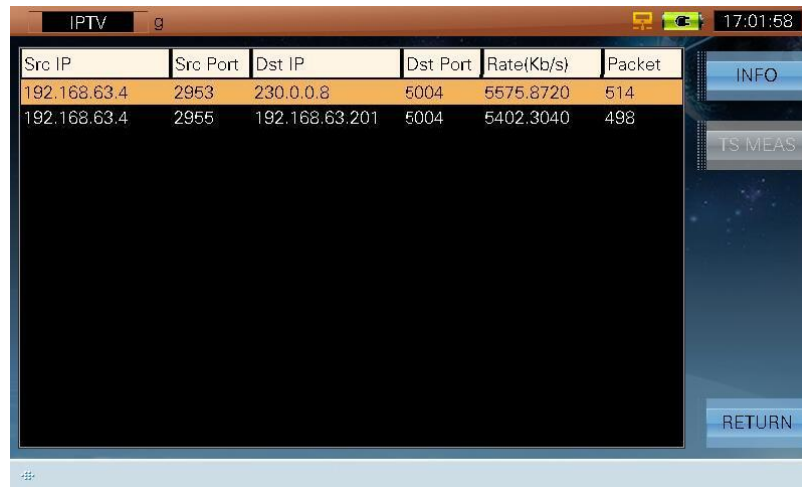
To set alarm parameters.

6. IPTV

- IPTV

6.1 IPTV

S7000 will recognize and display the information of the TS when the network has the TS. Refer to Figure 6-1.



Src IP	Src Port	Dst IP	Dst Port	Rate(Kb/s)	Packet
192.168.63.4	2953	230.0.0.8	5004	5575.8720	514
192.168.63.4	2955	192.168.63.201	5004	5402.3040	498

Buttons: INFO, TS MEAS, RETURN

Figure 6-1

- **INFO** Press this key, you can look over the information of TS. Refer to Figure 6-2.



IP Info			
Src IP:	192.168.63.11	Src Port:	55153
Dst IP:	230.0.0.8	Dst Port:	5004
MDI			
MDI:	51.661:0	MLR: 0	MLT: 0
Delay:	51.661 ms		
Ideal DF:	1.984 ms	MIN:15.245	MAX:147.732
IP Rate:	5.370 Mb/s		
TS			
BitRate:	5.852 Mb/s		
		MIN:3.861	MAX:7.377

Buttons: IP LIST, TS MEAS, RETURN

Figure 6-2

- **TS MEAS** The key is enabled when S7000 displays the information of IPTV. You can press the key to enter interface of TS Monitor & Analysis and the status bar of S7000 displays: IP TV. Refer to Figure 6-3.



Figure 6-3

Users can record and replay the current TS (**Section 5: Monitor & Analysis**).

- **RETURN** You can press the key to return the previous interface.

7. File Management

- Picture File Management
- Data File Management

Press  key (**HOME**) to return to main menu and press **F6 (FILES)** to File Management. S7000 provides internal memory space to store measurement data in LEVEL measurement, Channel Scan, Constellation function. The test result can be saved as JPG format or data format file.

7.1 Picture File

7.1.1 Operation

- **PICTURE/DATA** Press the key to view the list of all saved picture files. The files are identified by their name, date, time, as Figure 7-1.

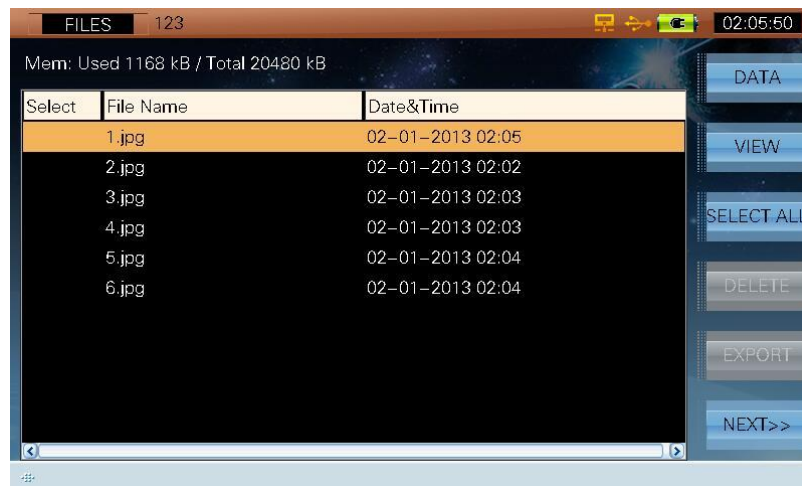


Figure 7-1

Press  keys (**UP/DOWN**) to highlight the file and select related key to VIEW, DELETE, EXPORT, SORT, RENAME and so on. Refer to Figure 7-1.

- **VIEW** Press this key and the picture file view and file name will appear in full screen. Press any key (except  key (**HOME**)) to return to file list window.
- **SELECT ALL/CLEAR** Press this key to select all files and all files are with 'V' indicator, as Figure 7-2. At this time, this key will be changed to **CLEAR**. Press this key to de-select all files and all files are without 'V' indicator.

To select (with 'V' indicator) / de-select single file(without 'V' indicator), please press  keys (**UP/DOWN**) to the file and press  key (**ENTER**), as Figure 7-3.

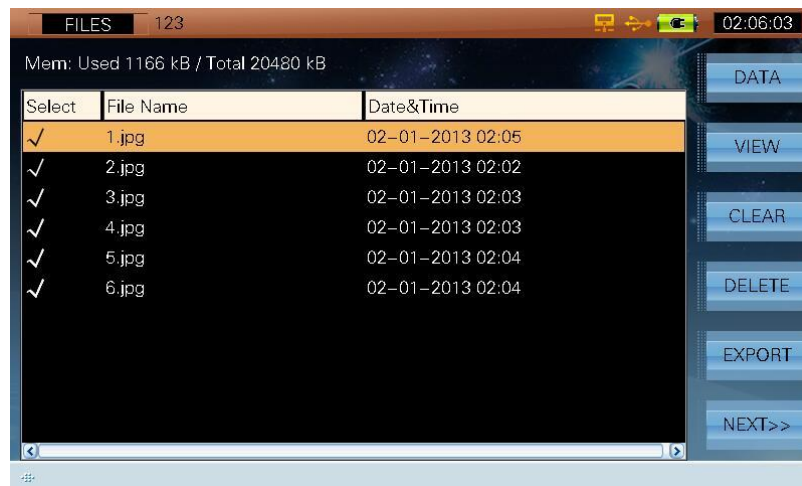


Figure 7-2

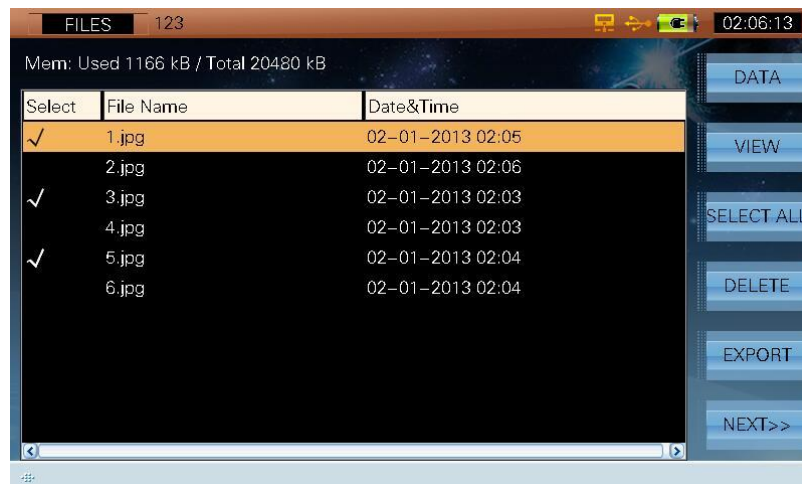


Figure 7-3

- **DELETE** Highlight the file and press this key the dialog box 'Delete selected file(s)' will appear. Select 'YES' to delete the file and 'NO' to give up.

Note: This key is disabled if no file is highlighted.

- **EXPORT** The files with 'V' indicator can be transferred to outside storage equipment by USB interface. Connect the USB device and press this key, one dialog box will appear: Send selected file(s) to USB device? Select 'YES' to send the file and 'NO' to give up.

Note: This key is disabled if no file is highlighted and the instrument does not recognize the USB device.

- **NEXT>>** Press this key to next page as Figure 7-4.

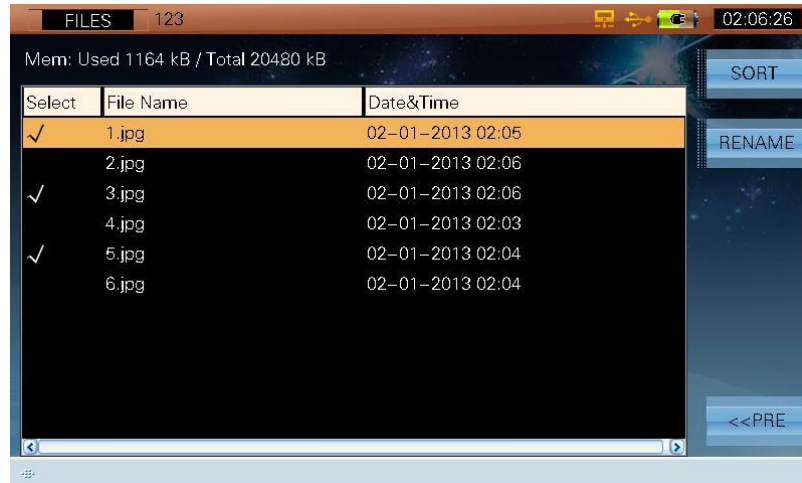


Figure 7-4

- **SORT** Press this key to sort the file in list. The sort key words include Ascend, Descend, Name and Date as Figure 7-5.

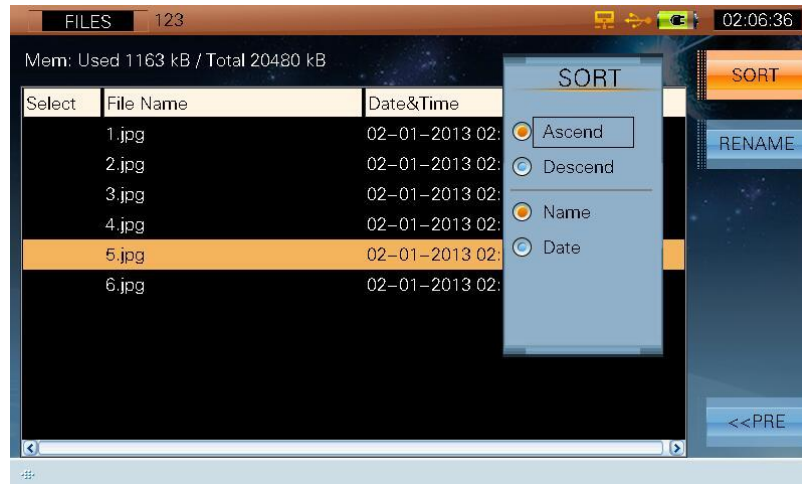


Figure 7-5

- **RENAME** Press this key and rename dialog box will appear, use the alphanumeric keypad to enter a new name and confirm, as Figure 7-6.

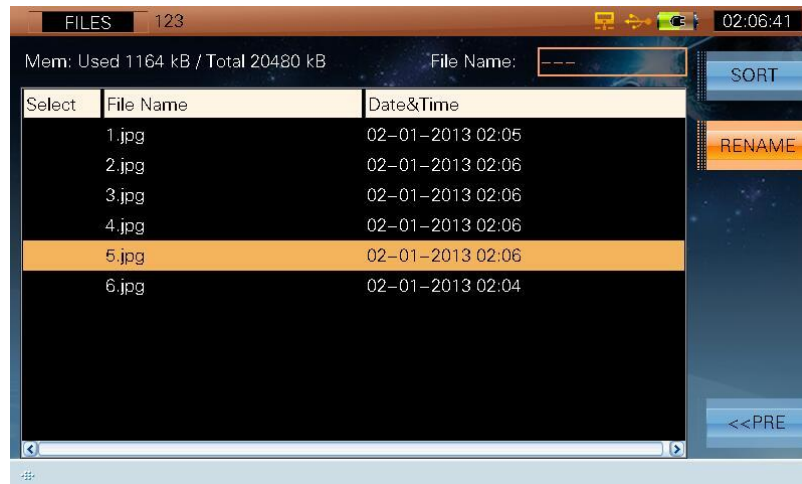


Figure 7-6

- **<<PRE** Press this key to previous page as Figure 7-1.

7.2 Data File

7.2.1 Operation

- **DATA/PICTURE** Press this key to view the list of all saved data files. The files are identified by their name, type, date, time and operator, as Figure 7-7.

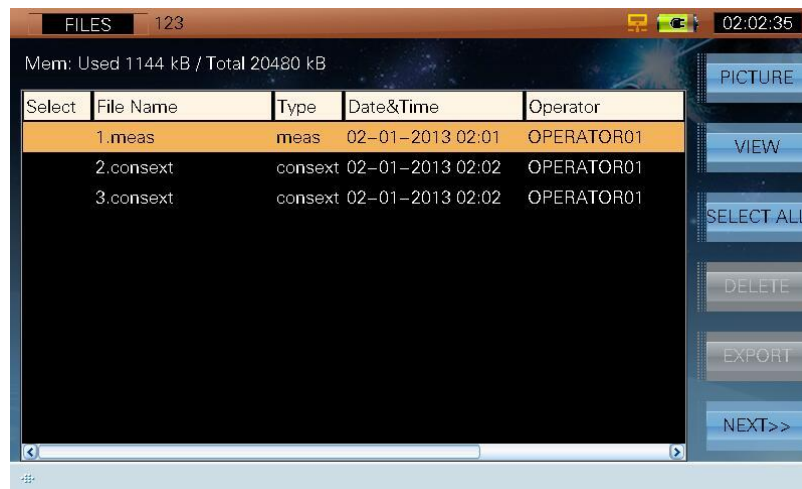


Figure 7-7

Press  keys (**UP/DOWN**) to highlight the file and select related key to VIEW, DELETE, EXPORT, SORT, RENAME and so on. Refer to Figure 7-7.

- **VIEW** Press this key to view the data file. As some file includes both graph and data. A dialog box will appear: Select 'YES' to view graph or 'NO' to view Data?
If select 'YES' to view graph, select  key (**ESC**) to return to file list. If select 'NO' to view data, press this key to return to file list.
- **ESC** Press the key to return to file list.
- **SELECT ALL/CLEAR** Press this key to select all files and all files are with 'v' indicator, as Figure 7-8. At this time, this key will be changed to **CLEAR**. Press this key to de-select all files and all files are without 'v' indicator.

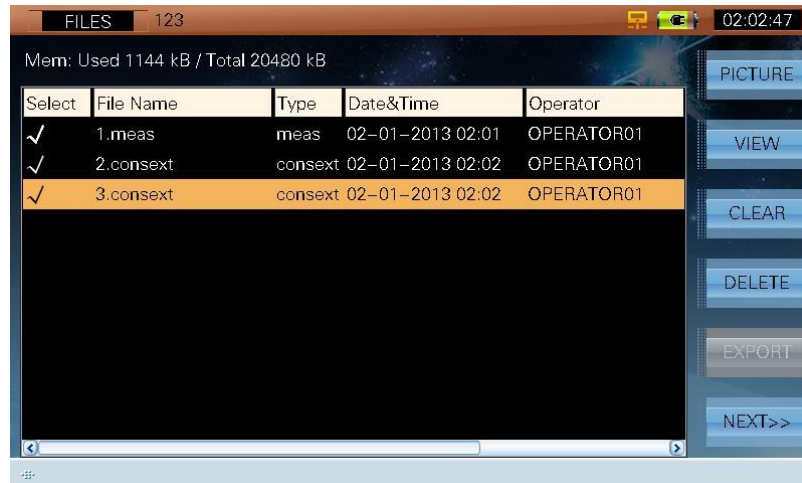


Figure 7-8

To select (with 'v' indicator)/ de-select single file(without 'v' indicator), please press keys (UP/DOWN) to the file and press key (ENTER), as Figure 7-9.

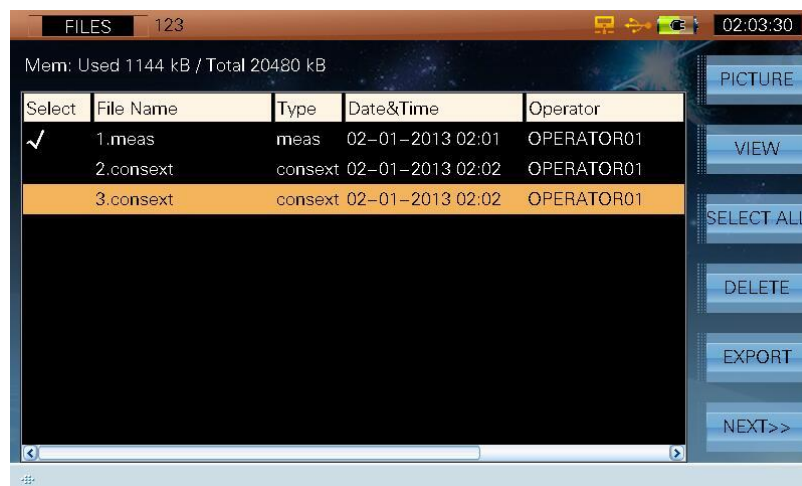


Figure 7-9

- **DELETE** Highlight the file and press this key the dialog box 'Delete selected file(s)' will appear. Select 'YES' to delete the file and 'NO' to give up.

Note: This key is disabled if no file is highlighted.

- **EXPORT** The files with 'v' indicator can be transferred to outside storage equipment by USB interface. Connect the USB device and press this key, one dialog box will appear: Send selected file(s) to USB device? Select 'YES' to send the file and 'NO' to give up. If users select 'YES', the dialog box will pop up: Select 'YES' to export files as CSV format or 'NO' to export original files.

Note: 1 Users can export two formats files, one is CSV format, the other is original files.

2 This key is disabled if no file is highlighted and the instrument does not recognize the USB device.

- **NEXT>>** Press this key to next page as Figure 7-10.

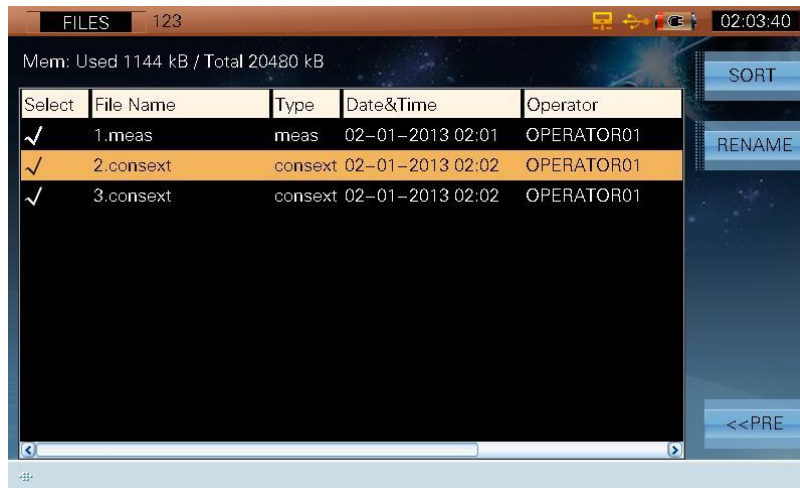


Figure 7-10

- **SORT** Press this key to sort the file in list. The sort key words include Ascend, Descend, Name, Type, Date and Operator as Figure 7-11.

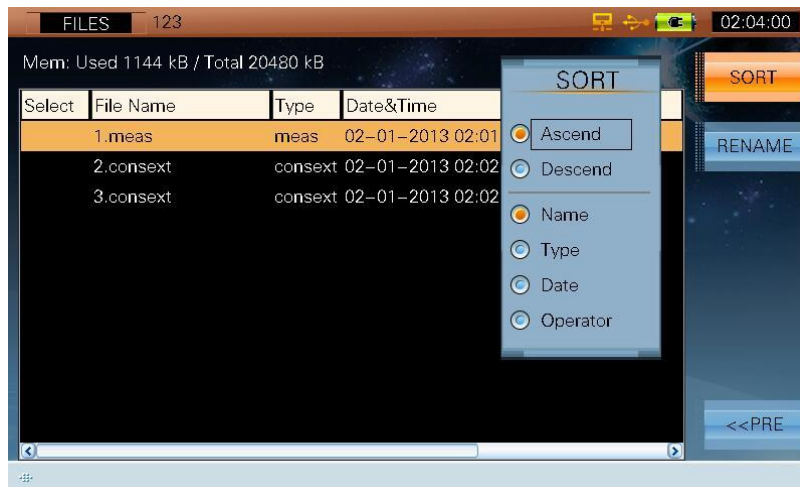


Figure 7-11

- **RENAME** Press this key and rename dialog box will appear, use the alphanumeric keypad to enter a new name and confirm, as Figure 7-12.

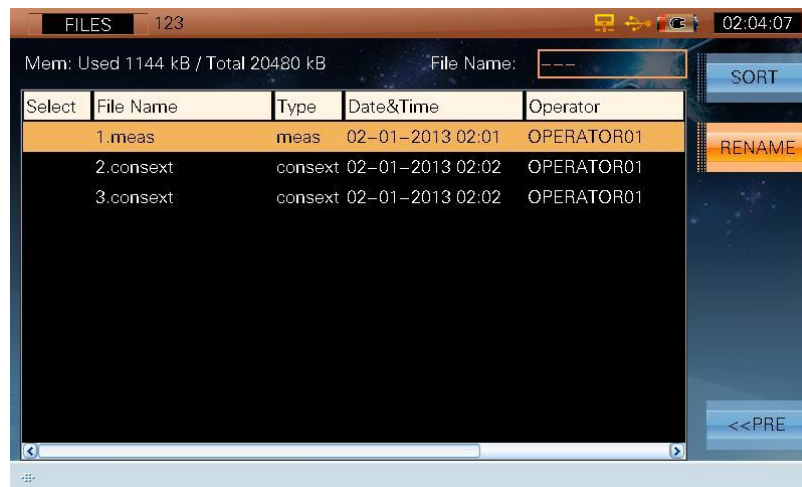


Figure 7-12

- **<<PRE** Press this key to previous page as Figure 7-7.

8. Appendix

- Specification
- Explanation of terms

8.1 Specification

Spectrum Analyzer	
Frequency Range	5~1050MHz(TV), 950~2150MHz(Satellite)
Frequency Span	0~1045MHz(TV), 10MHz~1200 MHz (Satellite)
Frequency Step	10kHz(TV), 1MHz(Satellite)
Resolution Bandwidth (-3 dB)	30 kHz, 100kHz,300 kHz, 1MHz, 3MHz(TV)
	AUTO(Satellite)
Level Measurement Range	10~120dBμV(TV) 30~120dBμV(Satellite)
Accuracy Of Measurements	±1.5dB
Measurement Detector	Peak, sample, AVG(TV)
Reference Level	30~120dBμV
Markers	2(TV), 1(Satellite)
Analogue TV Measurement	
Standards	B/G, I, D/K, L/L', M/N
Color Standards	PAL, SECAM, NTSC
Hum Measurement	1%~15%
C/N	> 50dB
Level Measurement Range	30~120dBμV
Accuracy Of Measurements	±1.5dB
Level Resolution	0.1dB
Digital CATV Measurement	
Modulation Type	16/32/64/128/256QAM J.83 ANNEX A/B/C
Symbol Rate	4.0~7.0MS/s
Power Level Range	30~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	~40dB
MER Accuracy	±2.0dB
BER	1E-3~1E-9
Constellation	√
DVB-T Measurement	
Modulation Type	QPSK, 16 QAM, 64 QAM
Power Level Range	25~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	> 30dB
MER Accuracy	±2.0dB
CBER	1E-1~1E-5
VBER	1E-1~1E-7
Constellation	√
MER Versus Carriers	√

Echo Pattern	√
DVB-T2 Measurement	
Modulation Type	QPSK, 16 QAM, 64 QAM, 256QAM
Power Level Range	25~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	> 32dB
MER Accuracy	±2.0dB
CBER	1E-1~1E-6
LBER	1E-3~1E-8
Constellation	√
Echo Pattern	√
ATSC Measurement	
Modulation Type	8VSB
Power Level Range	25~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	~40dB
MER Accuracy	±2.0dB
BER	1E-3~1E-9
Constellation	√
DTMB measurement	
Carriers	C=1, 3780
Power Level Range	25~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	> 28dB
MER Accuracy	±2.0dB
BER	1E-1~1E-5
Constellation	√
Echo Pattern	√
DVB-S/S2 measurement	
Modulation Type	QPSK, 8PSK
Symbol Rate	2 ~ 45MS/s(DVB-S)
	1 ~ 45MS/s(QPSK DVB-S2)
	1 ~ 45MS/s(8PSK DVB-S2)
Power Level Range	40~110dBμV
Power Resolution	0.1dB
Power Level Accuracy	±2.0dB (C/N>20dB)
MER Measurement	> 25dB
MER Accuracy	±2.0dB
CBER	1E-1~1E-6
LBER(VBER for DVB-S)	1E-3~1E-8
Constellation	√
Video/Audio Decoder	

Video	MPEG2/4, H.264
Video Resolution	1080i, 720p, 576i
Audio	MPEG1/2, AAC
CAM Module	EN50221(DVB-CI) PCMCIA interface
TS-ASI Input And Output	√
TS Record	√
TS analysis	
Interface	EN 50083-9(DVB SPI,ASI)
DVB-ASI Interface	75Ω BNC
DVB-ASI Clock	270MHz
DVB-ASI Max Data Rate	0 to 72 Mbps
DVB-ASI Output Signal Level	1.0 Vp-p nominal
DVB-ASI Return Response	>15dB
DVB-ASI Input Level	800 mV +/- 10%
Real time Decoder	Display the real television pictures (through CA system). Including program numbers, program names, provider information, video & audio PIDs
TR101290 Monitor	TR101 290 three levels real time monitor
Base Information	Count the PIDs percent according to the type of the streams. Videos, Audios, PSI/SI, Null Packages
PID List	Display all the PIDs in current stream
Program Information	The detail infos about a program if it isn't be encrypted. The video resolutions and audio compress rate.
PCR Monitor	Calculate PCR interval and PCR accuracy
PSI/SI List	Display the PSI/SI infos by tree view. Including PAT,PMT,CAT,(NIT,SDT,RST,TDT,EIT options)
Program Info	EPG
PID Capture	Capture a specified PID by it's type: Video, Audio, PSI(PAT,PMT,NIT,TDT,RST,SDT,EIT) etc. And display the data in HEX format
Transport Stream Record and Replay	Support USB device for transmission
Interface	
RF Input	75Ω F
HDMI Output	1
USB	1 USB2.0
LAN	1 10/100M
CAM	1 PCMCIA
TS-ASI Input/Output	2 75Ω BNC
DC Supply Input	12V/5A
GPS Input	USB
General	
Display	7 Inch TFT LCD 800×480 pixels
AC/DC Adapter	AC 100-240V/50-60Hz DC 12V/5A
Battery	Li-ion, 7.4V/13Ah
Charge Time	around 5 Hours

Working Time	>5 Hours
Remote Feeding	5/13/15/18/24 V, Max. 5W
22 kHz Control Signals	DiSEqC 1.2 and SaTCR
Dimension (W×H×L)	245mm×194mm×105mm
Weight	around 2.8kg
Working Temperature	-10～+50°C
Storage Temperature	-20～+70°C
Option	
DVB-CI	
ASI IN/OUT	
TS Analysis	
DVB-T2	
IPTV	

8.2 Explanation of terms

AVG	Average
BER	Bit Error Rate
CA	Conditional Access
DiSEqC	Digital Satellite Equipment Control
MER	Modulation Error Ratio
EVS	Error Vector Spectrum
INFO	Information
LNB	Low Noise Block
MAC	Media Access Control layer
PCR	Program Clock Reference
PID	Packet Identity
PLP	Physical Layer Pipes
POS	Positive
PSI/SI	Program Specific Information/Service Information
RBW	Resolved BandWidth
SAMP	Sample
SaTCR	Satellite Channel Router
TP	Transponder
V/A	Video/Audio

8.3 Function of S7000

	Function	S7000	S7000L
1	ANALOG TV、FM	■	■
2	DVB-C	■	□
3	DVB-T	■	□
4	DVB-S/S2	■	□
5	DVB-T2	□	△
6	DTMB	□	△
7	CAM	□	×
8	ASI	■	×
9	TS Analysis	□	□
10	IPTV	□	□

The symbols are shown as following:

- ✓ ■: Have this function.
- ✓ □: The function can be used by obtaining the software rights.
- ✓ △: You must upgrade the hardware first and then the function can be used by obtaining the software rights.
- ✓ ×: Nonsupport.